

JEL Classification: D63; E60; O11; O15;
O23

DOI: [https://doi.org/10.31521/modecon.V30\(2021\)-03](https://doi.org/10.31521/modecon.V30(2021)-03)

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Economic Development Analysis: Implications of Fiscal Independence

Abstract. Introduction. The performance of economic development viewed from a macro perspective has created a dilemma for the government, particularly in terms of economic growth and income inequality, which have an important role but are difficult to go hand in hand. Based on the Tiebout model, fiscal decentralization can be used as a tool to encourage regional fiscal independence in the implementation of economic development which is considered capable of increasing economic growth and holding down the income inequality. The data used are cross-sectional data from 34 provinces in Indonesia for the period 2012 to 2020. The analytical approach used is a panel data dynamic relationship model with PVECM granger causality.

Purpose. This study aims to analyze the dynamic relationship between the fiscal independence, economic growth, and income inequality in Indonesia.

Results. There's a long-term causality between fiscal independence, income inequality, and economic growth. In the short term, fiscal independence only affects economic growth significantly but does not affect income inequality significantly. In the long term, economic growth has a positive significant effect on income inequality, while income inequality has an insignificant negative effect on economic growth. In the short-term balance, the variables of income inequality and economic growth have a two-way causality that can influence each other.

Conclusions. Increasing the level of fiscal independence in the short term will encourage economic growth, but not significantly in reducing income inequality. However, if the regional fiscal independence continues to be improved and optimizing the absorption of local revenue, the benefits will be felt in the long term.

Keywords: fiscal independence; economic growth; income inequality.

УДК 336.02

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Аналіз економічного розвитку: наслідки фіскальної незалежності

Результати економічного розвитку створили дилему для уряду, зокрема щодо економічного зростання та нерівності доходів, які відіграють важливу роль. З'ясовано, що між фіскальною незалежністю, нерівністю доходів та економічним зростанням існує довгостроковий причинно-наслідковий зв'язок. У короткостроковій перспективі фіскальна незалежність лише суттєво впливає на економічне зростання, але не впливає суттєво на нерівність доходів. У довгостроковій перспективі економічне зростання має позитивний значний вплив на нерівність доходів, тоді, як нерівність доходів має незначний негативний вплив на економічне зростання.

Доведено, що підвищення рівня фіскальної незалежності в короткостроковій перспективі сприятиме економічному зростанню, але не суттєво зменшить нерівність доходів. Однак, якщо регіональна фіскальна незалежність буде продовжувати покращуватися та оптимізує поглинання місцевих доходів, переваги відчуються в довгостроковій перспективі.

Ключові слова: фіскальна незалежність; економічного зростання; нерівність доходів.

Formulation of the problem. Economic development measured by the population's per capita income, growth, performance seen from a macro perspective is often structure, and income inequality [8]. The complex

¹Стаття надійшла до редакції: 15.11.2021

Received: 15 November 2021

dilemma that is the government's main concern in economic development is focusing on economic growth and income inequality [7, 8, 15, 21, 27] stating that Economic growth is the most dominant instrument in improving the quality of life and reducing income inequality in developing countries. However, increasing income inequality is also a barrier to achieving a balance of economic growth. Higher-income inequality will have an impact on suppressing economic growth by widening the gap between low-income groups and high-income groups [4, 11]. The main problem with income distribution is the difference in income distribution. Income inequality is an indicator that measures the distribution of people's income in an area or region within a certain period of time. Higher income inequality means that the distribution of income in society is becoming more and more unequal [16].

Kuznets' inverted U-shaped hypothesis theory stated that in the early stages of economic growth, relative income inequality increases then shows stability for a while and decrease at a later stage. In recent decades, Kuznets' hypothesis has been controversial and has been confirmed by several empirical studies [12, 38]. In the early stages of development, the very large differences in economic growth between regions led to an unequal distribution of income. In the long term, as the production factors of various regions become more optimal during the development period, the differences in output growth rates between regions will tend to shrink. This is manifested as an increase in per capita income [17]. Income inequality conditions are needed to accelerate economic growth because the initial development is to encourage growth rates that are concentrated in one or several regions. The creation of high job opportunities will affect people's purchasing power and ultimately improve people's welfare. Inequality of economic growth between regions will lead to income inequality [17].

Most of studies that have examined the relationship between economic growth and income inequality empirically, but the relationship between the two variables is still very complex [36]. Some studies have found that increasing economic growth will improve income distribution and reduce income inequality [17, 22, 29]. [4] also found that an increase in economic growth changes the composition of income, causing a decrease in income inequality. In contrast to the [9] findings that an increase in economic growth leads to an increase in income inequality. [3, 38] income inequality can affect economic growth. [9, 21] also found that income inequality can cause a decrease in the rate of economic growth.

Analysis of recent research and publications. Fiscal decentralization is a tool used by the government to increase regional fiscal independence in managing economic development [1, 26, 34, 35]. The freedom of local governments in managing transfer funds provided by the central government is expected to facilitate financial management, so the implementation of

regional development can be carried out properly and has an impact on the community welfare [19, 24].

In developed or industrialized countries, fiscal decentralization may be a successful tool to promote economic growth, but the consequences for developing countries are still a controversial issue. In general, fiscal decentralization is believed to be a successful way to increase the efficiency of public expenditures and revenues. Fiscal decentralization is also a way to transfer fiscal authority to the local government and limit central government control [13, 32]. The implementation of fiscal decentralization will be able to reduce income inequality and increase economic growth because local governments will be more effective in the production and supply of public goods. In addition, it can also increase economic efficiency [2, 5, 6, 10, 25, 31].

Developing countries are very interested in decentralization because decentralization is a means to increase the efficiency of public procurement and economic growth. A decentralized system can improve people's welfare by better adapting public services to local needs [23, 25], which in turn can accelerate revenue mobilization and the country's economic performance. Some economists believe that implementing fiscal autonomy to increase regional fiscal independence is a means to promote long-term economic growth, as they believe that it will lead to better allocation on resources and higher productivity, and possibly a smaller public sector. It's because local policies may take more into account regional and local conditions when providing public goods such as infrastructure and education, or competition between different level of government leads to lower tax rates and effective production of public goods under income constraints [35]. If a region has a high level of regional financial independence, it is expected that regional economic growth will also increase. Increasing regional financial capacity is basically an optimization of regional revenue sources which is an indicator of the level of regional financial capacity itself [18, 33].

Although fiscal decentralization has been implemented, income inequality and economic growth have not been able to go hand in hand. In Indonesia, there are still many regions that do not have sufficient fiscal independence because they still depend on transfer funds from the central government. Based on this situation, the researcher is interested in knowing more about the long-term and short-term relationship between the regional fiscal independence, economic growth, and income inequality.

The analytical approach used is a panel data dynamic relationship model with panel vector error correction model granger causality (PVECM granger causality). The following equation model is used to

reveal the relationship between economic growth (PE), income inequality (KP), and the level of fiscal independence (TKF).

$$\Delta KP_{i,t} = \alpha_{1i,t} + \sum \beta_{1i,t} \Delta TKF_{i,t-1} + \sum \gamma_{1i,t} \Delta PE_{i,t-1} + \sum \delta_{1i,t} \Delta KP_{i,t-1} + EC_{i,t-1} + \varepsilon_{1i,t} \quad (1)$$

$$\Delta PE_{i,t} = \alpha_{2i,t} + \sum \beta_{2i,t} \Delta TKF_{i,t-1}$$

$$+ \sum \gamma_{2i,t} \Delta PE_{i,t-1}$$

$$+ \sum \delta_{2i,t} \Delta KP_{i,t-1} + EC_{i,t-1} + \varepsilon_{2i,t}$$

Where t is the time period (t = 1,2,...,t), i shows the cross section data (i = 1,2,...,N), l is the lag of each variable, and ε_{1it} , ε_{2it} , ε_{3it} assumes the error rate in the model (error terms). It should be noted that ECit-1 is a long-term cointegration equation and the coefficients of each variable are short-term coefficients.

Formulation of research goals. This research studies the relationship between economic growth, income inequality, and fiscal independence empirically. The data used are cross-sectional data from 34 provinces in Indonesia and time-series data for the period 2012 to 2020. The data sources obtained from publications by the official website of the Indonesian Central Statistics Agency.

Outline of the main research material. Several criteria must be met before estimating the Granger causality VECM panel model. The first criterion that must be met is to identify non-stationary behavior in the model under study. This study uses the Augmented Dickey-Fuller (ADF) – Fisher method to observe the stationarity of the data. If the data used in a study is not stationary, it will produce biased results. Stationarity test results can be seen in Table 1 below.

Table 1. Stationary test

Variabel	Level		1 st Difference	
	Statistic	Prob.	Statistic	Prob.
TKF	49,8345	0,9520	315,284	0,0000
PE	118,538	0,0001	134,001	0,0000
KP	93,5968	0,0215	134,011	0,0000

Source: calculated by the author

The results of the Fisher unit root test at the 1st difference level show the probability value of fiscal independence, economic growth, and income inequality is less than 1 percent and 5 percent, meaning that fiscal independence, income inequality, and

economic growth stated to be stationary at the 1st difference level. Next, determine the optimal lag length. Determining the optimal lag is important to know the behavior and relationships between variables in the short term.

Table 2. Determination of Optimum Lag

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-155,2483	NA	0,021084	4,654361	4,752281	4,693160
1	-129,3542	48,74188	0,012833	4,157475	4,549153*	4,312670
2	-117,3482	21,54008	0,011768	4,069065	4,754501	4,340656
3	-106,3687	18,72984	0,011150	4,010843	4,990037	4,398830
4	-96,51197	15,94463	0,010958	3,985646	5,258599	4,490029
5	-77,48227	29,10426*	0,008263*	3,690655*	5,257366	4,311434*
6	-7,15617	7,675845	0,009380	3,798711	5,659181	4,535886

Source: calculated by the author

Determination of the optimal lag is free from correlation and other regression problems used in the Vector Autoregression model in this study is the AIC lag with the smallest value. The smallest AIC value obtained in the optimal lag test is at lag 5 for each variable in the model.

The next criterion that must be carried out is cointegration testing. If it is proven that there is cointegration in the equation, then the PVECM test will

be applied. A cointegration test is conducted to determine the long-term equilibrium relationship between two or more variables in the equation using the Johansen cointegration test method. Johansen cointegration test results shows the fiscal independence, economic growth, and income inequality in the period 2012 to 2020 have cointegration in other words, there is a long-term relationship between the three variables.

Table 3. Johansen Cointegration Test

Trace Test				
Null Hypothesis	Eigenvalue	Trace Stat.	0.05 Critical Value	Prob.
None*	0,396325	95,53097	29,7970	0,0000
At most1*	0,312114	44,04961	15,4946	0,0000
At most2*	0,056092	5,888086	3,84147	0,0152
Max. Eigenvalue Test				
Null Hypothesis	Eigenvalue	Max-Eigen Stat.	0.05 Critical Value	Prob.
None*	0,396325	51,48136	21,1316	0,0000
At most1*	0,312114	38,16152	14,2646	0,0000
At most2*	0,056092	5,888086	3,84147	0,0152

Source: calculated by the author

The result of the unit root test which states that there is non-stationary behavior at the level stage and there is cointegration in the model directs this study to apply the panel vector error correction model (PVECM) analysis.

Table 4. Panel Vector Error Correction Model (PVECM) Estimation

Variabel	C	$\Delta(\text{TKF})$	$\Delta(\text{PE})$	$\Delta(\text{KP})$	ECT	Notes
$\Delta(\text{PE})$	-2,928	0,037	1,456	-9,430	0,553	R ² : 0.727 Adj. R ² : 0.672 F-stat: 13.156 AIC: 3.881 SC: 5.477
	(0,499)	(0,118)	(0,243)	(22,931)	(0,225)	
	[-5,866]*	[0,317]	[5,994]*	[-0,411]	[2,457]*	
$\Delta(\text{KP})$	-0,005	0,0004	0,003	-0,467	-0,012	R ² : 0.367 Adj. R ² : 0.238 F-stat: 2.858 AIC: 3.881 SC: 5.477

Source: calculated by the author

The estimation results of the PVECM indicate that the fiscal independence variable has no significant effect on economic growth, but the distribution of economic growth lag and income inequality variables has a significant effect on economic growth. These results can be seen from the t-statistic value of fiscal independence with a value of 0.317 which is outside the range of the t-table value. The lag distribution variable is the value of economic growth in the previous year with a coefficient of 1.456, it means that if there is an increase in economic growth of 1 percent in the previous year, it would increase economic growth by 1.46 percent in the current year. The income inequality variable has a coefficient of -9.43, meaning that if in the previous year income inequality increased by 1 percent, economic growth would contract by 9.43 percent in the current year. Based on the PVECM estimation results in the first equation, the error correction term (ECT) value proves that there is a variable adjustment mechanism that has a significant influence in the long term. The magnitude of the balance between variables in the long term is 0.553, or it can be said that 55 percent of the imbalance in the shock period that

occurred previously formed a long-term balance in the current period. Therefore, between the variables of economic growth, fiscal independence, and income inequality, there is a long-term causality relationship. Different from the results identified by [28, 30] that fiscal independence has a fairly large impact on income inequality, specifically fiscal independence encourages an increase in the poor.

In the income inequality equation, the fiscal independence variable also has no significant effect, but the income inequality lag distribution variable and the economic growth variable show a significant effect on income inequality. Statistically, economic growth has a coefficient of 0.003, meaning that if there is an increase of 1 percent in the previous year's economic growth, income inequality will also increase by 0.3 percent in the current year. The lag distribution variable which is the value of income inequality in the previous year has a coefficient of -0.467, meaning that if income inequality in the previous year has increased by 1 percent, there will be a decrease in income inequality this year by 46.7 percent. The PVECM estimation results imply that the variables of economic

growth and income inequality have a two-way relationship that seems to influence each other between the two variables.

In the long-term balance, economic growth can have a positive and significant effect on income inequality, while income inequality has a negative but not significant effect on economic growth. Research conducted by [22, 29] found that increasing economic growth will increase income distribution and reduce income inequality. The results of this study are also supported by the [37] findings that income inequality on economic growth is mostly not statistically significant. [21] also found that income inequality can cause a decrease in the rate of economic growth. In addition, the impact of income inequality will be more significant on economic growth if it involves a wider area coverage. In contrast to research conducted by [3] that there is no long-term relationship between economic growth and income inequality. Economic

growth in a given year is significantly affected by economic growth in the previous year, as well as income inequality.

The estimation of short-term causality using the PVECM Granger Causality in the first equation has a null hypothesis, namely the lag of the fiscal independence variable and income inequality together do not affect the variable economic growth. Statistically, the chi-square probability has a value less than 5 percent, meaning that the fiscal independence and income inequality together have a short-term relationship to the variable of economic growth. Likewise in the first equation, the null hypothesis in the second equation states that the lag of the variable fiscal independence and economic growth together does not affect the variable income inequality. The chi-square probability of the second equation has a value greater than 5 percent, meaning that fiscal independence and economic growth together do not have a short-term relationship with the income inequality variable.

Table 5. PVECM Granger Causality Estimation

Variabel		$\Delta(\text{TKF})$	$\Delta(\text{PE})$	$\Delta(\text{KP})$
$\Delta(\text{PE})$	Chi-square	85,195	-	10,713
	Prob.	0,000***	-	0,057*
$\Delta(\text{KP})$	Chi-square	2,911	10,178	-
	Prob.	0,714	0,070*	-

Source: calculated by the author

PVECM granger causality estimation results show that economic growth and income inequality have a two-way causality that can influence each other in the short term. This is evidenced by the chi-square probability value of economic growth on income inequality is less than 5 percent, which is 0.07, and the chi-square probability value of income inequality on economic growth is less than 10 percent, which is 0.057. Fiscal independence in the short term can only affect economic growth which is in line with research conducted by [14, 33] which states that fiscal independence has a positive impact on economic growth. According to [33], if a region has high financial independence, it is expected that economic growth will also increase. In addition, Model Tiebout and [25] also state that fiscal independence will be able to encourage economic growth because local governments will be more effective in providing public goods. However, research by [20] found that in the category of underdeveloped regions, fiscal independence had no significant effect on economic growth because these regions still relied heavily on transfer funds from the central government. [26] found that fiscal

independence has a negligible negative effect on economic growth.

Meanwhile, fiscal independence in the short term can only affect the variable of economic growth with a chi-square probability value less than 1 percent, which is 0.000. In line with the findings of [4] that an increase in economic growth changes the composition of income, causing a decrease in people's income inequality. The results found in this study are slightly different from the results of research conducted by [3, 38] where there is only a one-way causality relationship from income inequality to economic growth. This shows that economic growth cannot affect income inequality, but income inequality can affect economic growth. [37] found that the short-term relationship between economic growth and inequality in both directions was not statistically significant.

The impulse response function (IRF) is used to explain the coefficients contained in the panel estimation of the VECM. The impulse response function describes the rate of shock from one variable to another within a certain period, so that the duration of the shock effect can be known, until the effect disappears or returns to the equilibrium point.

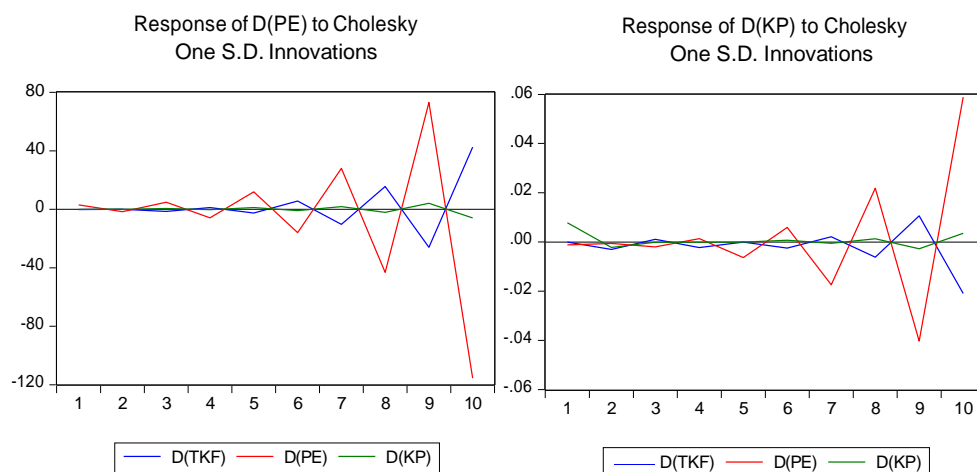


Figure 1 – Impulse Response Function

Source: built by the author

The response of economic growth to the shock of fiscal independence began to be felt in the third period which caused a negative effect and widened until it reached the highest response that occurred in the 10th period of 42 percent which gave a positive influence on economic growth. The shock of economic growth in the previous year affected the variable of economic growth itself which caused each period to experience positive and negative responses alternately until it reached the highest response in a negative balance. Next, the shock that occurs in the income inequality variable affects economic growth, reaching the highest response in the 10th period of -6 percent which has a negative effect on economic growth which then converges to a negative balance.

The effect of the shock of fiscal independence on income inequality has begun to be felt in the second period which has a negative impact and continues to have an effect until it reaches the highest response in the 10th period of -0.021 percent. The impact of the shock of economic growth on income inequality began to fluctuate in the third period, with

the fluctuations getting bigger until it reached 0.059 percent in the 10th period which had a positive impact. Then, the shock effect of the income inequality variable in the previous period on the income inequality variable itself in the current period with the highest response of 0.008 percent occurred in the first period and converged on a positive balance.

Conclusion. This study finds that fiscal independence, economic growth in the previous period, and income inequality have long-term causalities. However, fiscal independence in the short term only affects economic growth significantly and does not significantly affect income inequality.

The relationship between economic growth and income inequality in the long-term balance shows a significant positive effect given by economic growth on income inequality, while income inequality has an insignificant negative effect on economic growth. In the short-term balance, the variables of economic growth and income inequality have a two-way causality that can influence each other.

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