



Implementation of Decentralization Policy on Economic Growth in Central Java Province (GMM Arellano-Bond Approach)

Dinar Wahyuningrum; Izza Mafruhah; Mulyanto

Faculty Economic and Business, Sebelas Maret University, Indonesia

<http://dx.doi.org/10.18415/ijmmu.v9i9.3926>

Abstract

This study aims to analyze the influence of fiscal decentralization, regional inequality, and investment on economic growth. This study used 35 regencies/cities in Central Java for the 2013-2019 period with a dynamic panel data analysis method using the General Method of Moment Arellano-Bond approach. Data collected from the Central Bureau of Statistics. The results of this study show that fiscal decentralization has a negative and insignificant relationship to economic growth. Meanwhile, regional inequality and investment show a positive and significant relationship with economic growth.

Keywords: *Economic Growth; Fiscal Decentralization; Regional Inequality; Investment; GMM Arellano-Bond*

Introduction

Economic growth shows changes in economic activity in generating income for the people of a region in a certain period. Economic growth is one of the indicators of the economic success of a region. Indicators that can be used to measure economic growth are Gross Domestic Product (GDP) for the national scale and Gross Regional Domestic Product (GRDP) for the regional scale (Nabilah & Setiawan, 2016). In connection with the enactment of Law Number 1 of 2022 concerning Financial Relations between the Central Government and Regional Governments. The purpose of granting authority to regions to exercise the widest autonomy in regulating and managing government affairs themselves, including fiscal policies and financing.

Fiscal decentralization directly affects the considerable costs to support the needs of the regions to lead to established regional development. The provision of public goods and development to support economic activities in the regions as a reflection of the capabilities of local governments in controlling regional finances listed in the local government's financial statements as a sign of the sincerity of local governments to carry out their duties. Economic problems in districts/cities in Central Java Province are economic growth, high regional inequality, dependence on the central government. In this regard, the priority of development policies of local governments of regencies/cities in Central Java Province is directed at efforts to reduce inequality, increase regional financial independence and economic growth.

Based on macroeconomic aspects, judging from the value of real GRDP which shows positive developments, but is also followed by an increase in population every year. In addition, public sector development, has the aim of absorbing investment and increasing the number of jobs so as to reduce regional inequality, and increase economic growth. This is based on the function of local governments as providers of goods that are not provided by the private sector and strives for the allocation of economic resources to be carried out effectively and efficiently.

This study used a dynamic panel data regression model. Dynamic panel models can also be used to analyze the long-term and short-term impacts of an economic policy. In the dynamic panel data model, there is a lag of dependent variables that are positioned as explanatory variables. This variable correlates with error. The estimates used by OLS will result in biased and inconsistent estimators. To overcome this, the estimation method that will be used is the Arellano-Bond GMM. The Arellano-Bond GMM produces an unbiased, consistent, and efficient estimator. Based on the description from the background above, the author is interested in conducting research with the title "Determinants of Economic Growth in the Era of Decentralization (GMM Arellano-Bond Approach)".

Research Method

The population in this study was all regencies/cities in Central Java Province, namely as many as 30 regencies and 5 cities. The research time used was 2013-2019. The type of data used is secondary data by taking data from the Central Statistics Agency. Research variables include independent variables and dependent variables. The dependent variable in this study is economic growth. Meanwhile, independent variables are fiscal decentralization, regional inequality, and investment.

Operational Variables

Fiscal Decentralization

The measurement of fiscal decentralization in this study was carried out using the recipient approach, which is to measure the degree of fiscal decentralization from the share of regional revenues to the total regional revenues.

$$DDF = \frac{PAD}{TPD} \times 100$$

Where:

DDF = Degree of Fiscal Decentralization

PAD = Local Revenue

TPD = Total Regional Revenue

Source : (Halim, 2002)

The greater the value of the DDF, the higher the degree of fiscal decentralization in the region, and vice versa. The unit of the fiscal decentralization variable is percent.

Investment

Investment is the expenditure of a capital grower or company to purchase capital goods and production equipment to increase the ability to produce goods and services available in the economy. The data used in this study is the realization of foreign investment according to 35 regencies/cities in Central Java Province from 2013 to 2019 with units of millions of rupiahs.

Regional Inequality

Regional inequality is measured using the Williamson Index formula, where income is measured using GRDP per capita on the basis of constant prices in 2013 for each district/city in Central Java Province from 2013 to 2019. Meanwhile, the Regional Inequality Index is indicated by the numbers 0 to 1 or $0 < VW < 1$.

Panel data regression analysis is a regression analysis based on panel data (Gujarati & Porter, 2003). The panel data method used to understand dynamic adjustment is dynamic panel data regression. In general, the dynamic panel data regression model is as follows:

$$Y_{it} = \delta Y_{i,t-1} + \sum_{k=1}^K \beta_k X_{kit} + u_{it} \dots \dots \dots (1)$$

with δ , β_k , declares the bound variable $i = 1, 2, \dots, N$ $t = 1, 2, \dots, T$ Y_{it} of the i -th cross section of the t -time series, declares $Y_{i,t-1}$ the Y_{it} lag, declares the free variable of the unit of X_{kit} the cross section to i and the unit of the time series to t , declares the interception (α slope) to the free variable, and declares the error (u_{it} error) regression of the unit of the cross section to i and the t -time series unit, expressing scalar, are one-way error components. δu_{it}

The approach used in estimating the dynamic panel data regression model is the first-difference GMM (FD-GMM).

First-Difference Generalized Method of Moments (FD-GMM)

FD-GMM was developed by Arellano and Bond (1991). This approach results in an undistorted, consistent, and efficient estimator. The following is given an AR(1) autoregressive panel data model without including exogenous variables:

$$Y_{it} = \delta Y_{i,t-1} + u_{it} \dots \dots \dots (1)$$

A *one-step consistent estimator* is obtained by assigning a weighting matrix, i.e. A_N . (Arellano & Bond, 1991):

$$A_N = (N^{-1} \sum_{i=1}^N W_i^T G W_i)^{-1} \dots \dots \dots (2)$$

The results of the one-step estimator GMM Arellano-Bond estimator were obtained as follows:

$$\hat{\delta} = [(N^{-1} \sum_{i=1}^N \Delta Y_{i,t-1}^T W_i) A_N (N^{-1} \sum_{i=1}^N W_i^T \Delta T_i)]^{-1} [(N^{-1} \sum_{i=1}^N \Delta Y_{i,t-1}^T W_i) A_N (N^{-1} \sum_{i=1}^N W_i^T \Delta Y_i)] \dots \dots \dots (3)$$

by being a matrix of instrument variables. Instrument variables are variables that do not correlate with errors, but are correlated with explanatory endogenous variables. A *two-step consistent estimator* is obtained by substituting using the optimal matrix as follows A_N (Arellano & Bond, 1991):

$$\hat{v}_N^{-1} = [N^{-1} \sum_{i=1}^N W_i^T \Delta \hat{v}_i \Delta \hat{v}_i^T W_i]^{-1} \dots \dots \dots (4)$$

by being a residual vector obtained from a $\Delta \hat{v}_i$ *first-step consistent estimator*.

Model Specifications

In order to examine macroeconomic problems in Central Java which include economic growth, the degree of fiscal decentralization, regional inequality, investment.

$$Growth_{i,t} = \alpha_1 DDF_{i,t} + \alpha_2 IW_{i,t} + \alpha_3 logINV_{i,t} + \alpha_4 Growth_{i,t-1} + u_{i,t} \dots \dots \dots (5)$$

Variable	Variable Name
<i>Growth</i>	Economic Growth
<i>DDF</i>	Degree of Fiscal Decentralization
<i>IW</i>	Williamson Index
<i>logINV</i>	Investment
<i>i</i>	Identity
<i>t</i>	Time
<i>u_{it}</i>	Error

The analysis steps that will be carried out in this research are as follows.

1. Conducting a characteristic analysis and general description of economic growth in Central Java along with variables that are suspected to affect.
2. Evaluate the model on the OLS estimate.
3. Perform estimation using GMM Arellano-Bond.
4. Test the significance of model parameters simultaneously using the Wald test.
5. Partially test the significance of model parameters using A Z test.
6. Testing parameter specifications on models using the Arellano-Bond test and the Sargan test.
7. Conducting residual assumption testing of the model which has been obtained.
8. Draw conclusions based on the results of the analysis with is a residual vector obtained

Resuly and Discussion

OLS Estimation

Table 1. OLS Results

Prediktor	Koefisien	Standar Error	t	P-Value
<i>Growth_{t-1}</i>	0,6828	0,0482	14,18	0,000
<i>DDF</i>	-0,5333	0,9016	-0,59	0,555
<i>IW</i>	-0,4514	0,8163	-0,55	0,518
<i>logINV</i>	-0,0636	0,0500	-1,27	0,205
Cons	1,8566	0,3247	5,72	0,000

Based on Table 1, it can be seen that the previous economic growth had a lag coefficient value of 0.6828. Niali the lag coefficient of economic growth is worth less than one. If the value of the lag coefficient is more than one, the estimate to find the lag coefficient is not biased and consistent (H Dekiawan, 2014).

GMM Arellano Bond Estimates

Table 2. Partial Test Results

Prediktor	Koefisien	Standar Error	t	P-Value
<i>Growth_{t-1}</i>	0,7698	0,09183	8,38	0,000
<i>DDF</i>	-0,00210	3,3288	-0.00	0,999
<i>IW</i>	19,4133	8,0129	2,42	0,015
<i>logINV</i>	-0,0977	0,04610	-2,12	0,034
Cons	0,9620	0,7295	1,32	0,187

Based on table 2, it can be seen that regional inequality has a p-value of 0.999. So the decision was to accept H_0 who showed that fiscal decentralization had no significant effect on the model. However, regional inequality and investment have a significant effect on the model.

After conducting parameter significance testing, it further measures the criteria of the best model. The dynamic panel method with the Arellano-Bond GMM approach can be said to be good if it meets the criteria of consistency and validity of the instrument. The test results of the best model criteria will be explained in table 3.

Based on Table 3. It can be seen that the dynamic panel method with the Arellano-Bond GMM approach has met the criteria of the best model statistically, namely consistent and the instrument variables used are valid. The Arellano-bond (AB) results on m2 showed a p-value of 0.8984. In this study, the α was 5 percent, so the decision was to fail to reject H_0 . Thus, the estimation can be said to be consistent and there is no autocorrelation in the second-order first difference error.

Table 3. Model Criteria Results

Arellano-Bond Test Value	Statistical Value	P-Value
-1.1033 (m_1)		0.2699
-0.1277(m_2)		0.8984
Sargan Test Statistical Value		P-Value
21,79227		0.0830

Sargan's estimation results show a p-value of 0.0830. In this study, the α was 5 percent, so the decision was to fail to reject H_0 . Thus, there is no correlation between residual and over identifying restrictions or instrument variables that are used more than the number of parameters suspected. So, it can be said that there is no problem with the validity of the instrument.

Sargan's estimation results show a p-value of 0.0830. In this study, the α was 5 percent, so the decision was to fail to reject H_0 . Thus, there is no correlation between residual and over identifying restrictions or instrument variables used more than the number of parameters suspected. So it can be said that there is no problem with the validity of the instrument.

Long and Short Term Effects

The advantage of the dynamic panel model is that it can find out the short-run effect and the long-run effect. Elasticity results are obtained in Table (5)

Table 5. Results of Estimating Long- and Short-Term Effects

Prediktor	Koefisien	P-Value	Short Run Multiplier	Long Run Multiplier
$Growth_{t-1}$	0,7698	0,000		
DDF	-0,00210	0,999	-0,00210	0,7709
IW	19,4133	0,015	19,4133	0,0125
$logINV$	-0,0977	0,034	-0,0977	-0.8264
Cons	0,9620	0,187		

Based on Table 5, it can be known which model was obtained. The model of economic growth obtained is the following equation.

$$\widehat{Growth}_{i,t} = 0,9620 - 0,00210DDF_{i,t} + 19,4133IW_{i,t} - 0,0977logINV_{i,t} + 0,7698 Growth_{i,t-1}$$

Interpretation of significant variables affects the economic growth indicators of regencies/cities in Central Java. Based on table 5 it can be concluded that the lag coefficient of economic growth indicators has a positive and significant effect on economic growth. Thus it can be concluded that economic growth in the t year was dominated by last year's economic growth. On the other hand, regional inequality has a positive and significant impact on economic growth. If there is an increase in regional inequality by 1% then in the short term it will lead to an increase in economic growth of 19.14% and in the long term by 0.012%. Thus, it can be concluded that the influence of increasing regional inequality on the increase in economic growth in the short term is greater than the long-term influence. In addition, investment has a negative and significant impact on economic growth. If there is an increase in investment by 1% then in the short term it will cause a decrease in economic growth by 9.7% and in the long term by 82.64%. Thus, it can be concluded that the influence of increased investment on the increase in economic growth in the long term is greater than the short-term influence.

Based on the results of the estimates, not all coefficients indicate the direction corresponding to the theory. Such as regional inequality has a positive relationship with economic growth, then investment that has a negative relationship with economic growth. But there is one coefficient that corresponds to the theory of fiscal decentralization has a positive relationship direction.

Based on the estimated results, the variable decentralization fiscal does not affect economic growth. this result was obtained from Khamdana (2016) in his research. This condition indicates that the composition of local government expenditures is not right. This bias occurs because there is not yet a common perception and understanding in categorizing the types of spending, work plans, and development frameworks. In addition, the determination of the authority to obtain income is not appropriate in local governments, for example: local governments can impose taxes that are essentially the right /authority of the central government. The local government has not stopped to meet the needs of the people. This happens because the regional apparatus does not have adequate capabilities and the community is not given the right to conduct performance evaluations (Khamdana, 2016).

The Williamson index model provides a positive and significant relationship to economic growth. The value of the coefficient of positive regression indicates that any economic growth leads to an increase in the value of inequality, *ceteris paribus*. This is in line with research conducted by Mopangga (2011) stated that there is a relationship between regional inequality and economic growth. The orientation of achieving the pace of economic growth is not matched with a more even distribution of income, causing inequality (Mopangga, 2011).

The investment model shows a negative and significant relationship to economic growth. The value of the negative regression coefficient indicates that any increase in economic growth leads to a decrease in the value of investments. This is in line with research conducted by Bado (2016) it is stated that the distribution of investment figures in an area is still very unequal between regions. The investment figure is more dominated in certain sectors, for example in districts dominated by the agricultural sector so that the absorption of labor is also still not optimal creating new jobs for the surrounding community. In urban areas, it rests on the trade sector and real estate hotel buildings. Investments that are not oriented towards maximum employment, will only lead to increasing unemployment, and ultimately have a negative influence on economic growth (Bado, 2015)

Conclusion

The application of the Arellano-Bond GMM estimate to the economic growth analysis shows that the lag coefficient of economic growth indicators has a positive and significant effect on economic growth. Thus it can be concluded that economic growth in the t year was dominated by last year's economic growth. On the other hand, regional inequality has a positive and significant impact on economic growth. If there is an increase in regional inequality by 1% then in the short term it will lead to an increase in economic growth of 19.14% and in the long term by 0.012%. Thus, it can be concluded that the influence of increasing regional inequality on the increase in economic growth in the short term is greater than the long-term influence. In addition, investment has a negative and significant impact on economic growth. If there is an increase in investment by 1% then in the short term it will cause a decrease in economic growth by 9.7% and in the long term by 82.64%. Thus, it can be concluded that the influence of increased investment on the increase in economic growth in the long term is greater than the short-term influence.

References

- Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58(2), 277–297. <https://doi.org/10.2307/2297968>
- Bado, B. (2015). Analisis belanja modal, investasi, dan tenaga kerja terhadap pertumbuhan ekonomi sulawesi selatan (capital expenditures analysis, investments, and employment on economic growth south sulawesi). *Jurnal Ilmiah Econosains*, 13(2), 34–42. <https://doi.org/10.21009/ECONOSAINS.0132.03>
- Didi Djajuli. (2018). Peran pemerintah dalam pembangunan ekonomi daerah. *Dinamika : Jurnal Ilmiah Ilmu Administrasi Negara*, 5(2), 8–21. <https://doi.org/10.25157/DINAMIKA.V5I2.1409>
- Gujarati, D. N., & Porter, D. C. (2003). *Basic Econometric*. McGraw-Hill.
- H Dekiawan. (2014). Konvergensi Penerimaan dan Pengeluaran Pemerintah Provinsi di Indonesia: Pendekatan data panel dinamis spasial. *Buletin Ekonomi Moneter Dan Perbankan*, 17(1), 99–128. <http://bmeb-bi.org/index.php/BEMP/article/view/52>
- Halim, A. (2002). *Seri Akuntansi Sektor Publik-Akuntansi Keuangan Daerah*. Salemba Empat.
- Hartono, J. (2016). *Teori Portofolio dan Analisis Investasi*. BPFE UGM.
- Ismail, M. (1995). *Teori Pertumbuhan dan Pemerataan*. Prisma.

- Kartira Dorcas Andhiani, Erfit, & Adi Bhakti. (2018). Analisis pertumbuhan ekonomi dan ketimpangan pembangunan di Wilayah Sumatera. *Jurnal Perspektif Ekonomi Dan Pembangunan Daerah*, 7(1), 26–34. <https://online-journal.unja.ac.id/pdpd/article/view/4602>
- Khamdana, A. (2016). Pengaruh Desentralisasi Fiskal Terhadap Pertumbuhan Ekonomi Daerah di Indonesia, 2008–2012. *Indonesian Treasury Review: Jurnal Perbendaharaan, Keuangan Negara Dan Kebijakan Publik*, 1(1), 23–38. <https://itrev.kemenkeu.go.id/index.php/ITRev/article/view/59>
- Kurniawan, D. (2012). Otonomi Daerah Dan Desentralisasi Fiskal Di Indonesia. *E-Jurnal Unisfat*, 7(2), 129–144.
- Kuznets, S. (1955). Economic Growth and Income Inequality. *The America Economic Review*, 45(1), 1–28.
- Mopangga, H. (2011). Analisis Ketimpangan Pembangunan dan Pertumbuhan Ekonomi di Provinsi Gorontalo. *Trikonomika*, 10(11), 40–51.
- Nabilah, D., & Setiawan. (2016). Pemodelan Pertumbuhan Ekonomi Indonesia Menggunakan Data Panel Dinamis dengan Pendekatan Generalized Method of Moment Arellano-Bond. *Jurnal Sains Dan Seni*, 5(2), 205–210.
- Putri, P. I. (2014). PEengaruh investasi, tenaga kerja, belanja modal, dan infrastruktur terhadap pertumbuhan ekonomi pulau jawa. *Jejak*, 7(2), 100–202. <https://doi.org/10.15294/jejak.V7I2.3892>
- Reksohadiprojo, S. (2001). *Ekonomi Publik*. BPFE UGM.
- Williamson, J. G. (1965). Regional Inequality and the Process of National Development: A Description of the Patterns. *Economic Development and Cultural Change*, 13(4, Part 2), 1–84. <https://doi.org/10.1086/450136>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).