

## **Fiscal Decentralization and Regional Economic Growth in Indonesia: A Spatial Econometric Approach**

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### ***ABSTRACT***

*This paper uses the regional economic growth perspective to explore the impact of fiscal policy on provincial per capita income. Specifically, the objective of this paper is to examine the dynamics of fiscal policy with respect to the process of transferring funds by the central government to local governments. The research used the spatial Durbin model (SDM) to estimate panel data from 33 provinces in Indonesia for 2004-2015 period. Results showed that the transfer of funds does not have a significant impact on provincial per capita income. In relative terms, fiscal transfer amounting to 75 percent of local government domestic product contributes to an increase of 2.79 percent in regional per capita income. Results also showed that investment of 1 million US\$ in export activities increases local per capita income by 3.42 percent. Overall, results showed that the transfer funds in combination with local government revenue sources, induced an increase of 0.35-1.39 percent in local per capita income, with the effect showing more prominence in provinces with low than those with high GRDP. Thus, enhancing the effectiveness of funds that are transferred from the central government to local governments requires prioritization of the allocation to productive sector activities.*

**Keywords:** *decentralization; growth economic; spatial Durbin model*

## INTRODUCTION

Widespread discontent by regional governments over the over-centralization of the control of the distribution and management of natural resources to a large extent contributed to the downfall the New Order regime. Mining and extractive sector exports are an important source of provincial government revenues such provinces as Riau, East Kalimantan, Southeast Sulawesi, Maluku, Papua, and West Papua, which in general have low regional per capita income. Nonetheless, provincial population do not benefit much from mining and extractive sector exports that are abundant in their provinces. Consequently, abundant natural resources contribute little to the welfare of the population in such provinces. The disparity in economic and social development between Eastern and Western Indonesia has characterized Indonesian post-Independence economy and society. Despite various efforts to create new growth centers in Eastern Indonesia by the central government to mitigate economic disparity between the two parts of the country such as the establishment of special economic zones (KEK) and integrated economic development zones (KAPET), Western Indonesia in general and Java and Sumatra Islands in particular, continue to be the main center of economic growth and development contributing 79-80 percent to the country's gross domestic product (BPS, 2004-2015).

Decentralization policy has been the cornerstone of efforts by successive refor-

mation governments to redress imbalances and disparity in economic development in Indonesia. Various triggers have been associated with the adoption or decentralization policy in developing countries. . Litvack & Ahmad (1998) underscore the important role the emergence of multiparty political systems in Africa played in the adoption of decentralization policies. Meanwhile, the fundamental shift from the centralized state-controlled economy to the market economy model, was the trigger that set off the decentralization policy drive in transition economies. In the East Asian Countries, the clamor for improvement in the quality of primary services from residents in urban areas which the central government agencies could not deliver because of the various constraints it faced, played a vital role in creating forces that led to the adoption of decentralization policy. efforts to defuse inter-ethnic tensions, conflicts and separatist movements and reduce the impact of diversity of geography on socio and economic development in South Asia(Bosnia and Herzegovina, Ethiopia, and Russia, have also been associated with the decentralization of administrative, government, and delivery of public services. (Martinez-Vazquez, Lago-Peñas, & Sacchi, 2016).

Nonetheless, many countries adopt decentralization policy to reduce poverty and economic inequality (Sepulveda & Martinez-Vazquez, 2011). This is because decentralization increases the chance that voices of the poor are heard, which in turn en-

hances their participation in the public policy process. Consequently, the poor enjoy better access to and quality of public goods and services, which in turn reduces their vulnerability (Silas et al., 2018). Furthermore, decentralization has been associated with increasing economic growth (Khan, 2013; Martinez-Vazquez et al., 2016) through better targeting of government spending thanks to greater financial autonomy of local governments that fosters improvement in budget allocation, setting of development priorities, accountability, and responsiveness (Agyemang-Duah et al., 2018). Besides, decentralization enhances economic efficiency because local governments are better positioned than national governments to provide public services that the population living in areas under the jurisdiction of local governments need. Equipped with autonomy to formulate and implement fiscal, political and administrative policies that are based on and informed aspirations and needs of the population, are able to achieve regional prosperity and welfare.

The implementation of fiscal decentralization creates opportunities to improve the economic wellbeing of society. This is because of that fact that the transfer of funds to local government often consists of subsidies, and allocation of public goods that are effectively allocated to the population in their jurisdictions given the authority that decentralization policy vested in them, and their good knowledge and understanding of

conditions on the ground. Thus, by devolution fiscal authority to local governments, both the efficiency of public financial management and effectiveness of the delivery public services such as health and education increase. This is because of the reduction or mitigation of the adverse impact that information limitations and constraints of the central bureaucracy about local socio-economic, cultural and political context (Nurfutriani & Hartarto, 2018; Soejoto et al., 2015).

Two approaches are used to assess the impact of decentralization on poverty reduction. The first involves using personal expenditure, and the second is based on personal income. Decentralization research by and large use personal and household expenditure approach (Valaris, 2012; Asante & Ayee, 2010), that examine among other areas extent to which budget allocation, determination of priorities, accountability, and responsiveness, improvement of the credibility of institutions (Agyemang-Duah et al., 2018). As regards research on the impact of decentralization on indicators of society wellbeing in Indonesia, most previous studies used the expenditure approach, specifically government spending. A study on the influence of local government expenditure on health and education (Soejoto et al., 2015; Maharajabdinul et al., 2015; Fossati, 2016; Guritno et al., 2018), showed that decentralization contributed significantly to the reduction of poverty incidence.

Moreover, most research on the im-

impact of decentralization on poverty reduction use transfer funds panel data on local government revenues and expenditures in Kenya for the period 2002-2014, and in 48 States in the United States (Silas et al. 2018) and (Valaris, 2012), respectively. Gross Regional Domestic Product (GRDP) per capita is the most commonly used indicator of poverty in a region or state. Despite that one of the social variables, education attainment, is one of the key determinants of poverty, such impact is mediated by other economic conditions This is corroborated in a research by (Soejoto et al., 2015) Maharajabdinul et al., (2015) which found that education and health did not have direct impact on poverty reduction. On the contrary, the level of investment had a direct influence on the performance of an economy. It should be noted that economic growth of a region is not independent of distance and space variables. To that end, location has become increasingly important in research on decentralization. In an analysis of on the influence of transportation on inequality, Martinez-Vazquez et al. (2016) found that improving transportation infrastructure through the development of inter-regional networks reduces inequality. Nonetheless, the research did not include spatial dimension among the variables. Transportation network induces improvement in education, expansion of health services, which two variables are key determinants of poverty incidence. Distance, is another factor that has been associated with weak condition of local institutions, as is

local government corruption (Asante & Ayee, 2010). Nonetheless, Bolivia's experience shows that the implementation of decentralization policy can strengthen local institutions, regardless of the distance of districts from the center of the national government (Faguet, 2004), which is contrary to research results on decentralization in Ethiopia (Alene, 2017). Faguet (2004)'s model is one of the models on government policy that is based on the role that location plays in the mobility of capital, goods, and labor on the regional economy. Using Faguet (2004) model, Ramírez, Díaz, & Bedoya (2017) simulated policy scenario of policy regimes Colombia that were based on spatial differentiation, showed that they contributed to higher effectiveness in reducing multidimensional poverty. Despite the fact that regional economic growth analysis has used econometric spatial modeling, the results have not been used as inputs in policy formulation. This is especially the case in Indonesia.

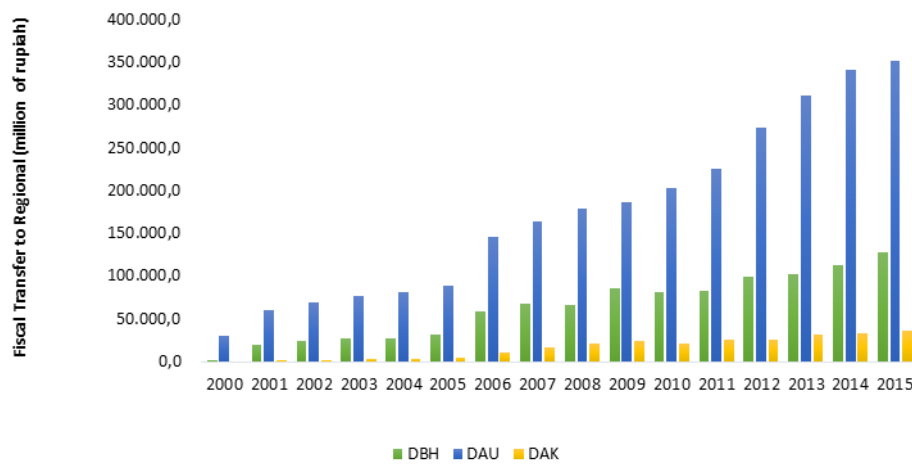
Space and location play key role in economic growth of provinces. This is reflected in several features and developments. Every region or province have different characteristics, including population, geography, and natural resources. In other words, even at the province level, there is a lot of heterogeneity, let alone different provinces. Thus, building connections across regions can strengthen economic links that generate benefits for the provinces and the country. It is no longer a debatable that there are differ-

ences in economic growth across provinces in Indonesia, between provinces that are located in Eastern part and those that are located in Western part of the country, which influences disparity in per capita income in the two parts of the country. It is also a fact that some provinces are industrial centers, while others are peripheral regions that supply raw materials and others have no contribution to industry. There are regions which have the same potential but play diametrically different roles in domestic economy. The debate on the impact that fiscal decentralization has on poverty reduction remains strong with some empirical evidence showing posi-

to explore the regional government revenue allocation effectiveness. This is because local government revenues is one of the most important determinants of regional economic growth for particular provinces with potential spillovers to other regions, and ultimately the domestic economy. This research analyzes the influence that fiscal decentralization has on provincial government revenues, by taking into consideration the location space of the provinces (spatial and distance factors).

*Indonesian context*

Fiscal transfers, in forms of general grant (DAU), special grants (DAK), and de-



**Figure 1. Transfer Funds to Regions and Village Funds, 2000-2015**

*Source: data DJKP (Directorate General of Financial Balance (2000-2015))*

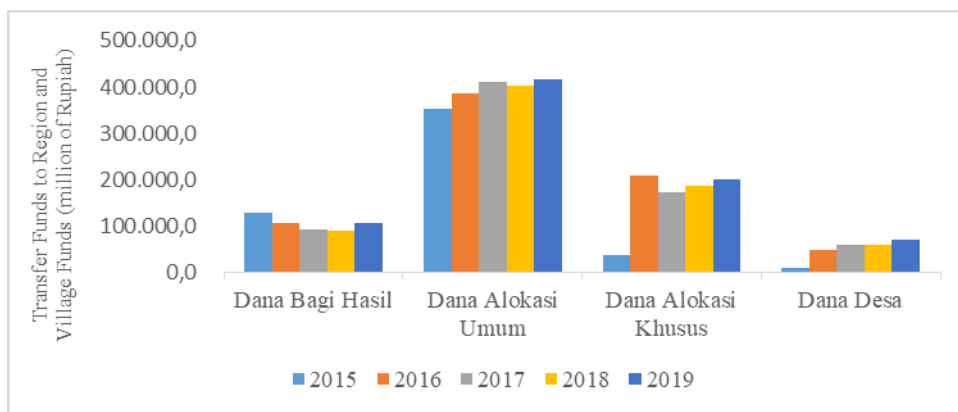
tive results while others shows the opposite. There is still debate as to whether estimating the influence of decentralization by using regional government revenues can generate better results that analyses that use regional government expenditure, by providing space

concentration grant (DD), constitute key elements of the decentralized system, which Indonesia implemented in 2001. Since the implementation of decentralization in Indonesia (16 years ago), decentralization in Indonesia, there has been a rapid increase in

the amount that are transferred from the central government to local governments. during the span of 16 years, the general grant has increased by 120.92 percent, Special grant has registered an increase of 92 percent, while revenue sharing grant experienced an increase of 27.58 percent (Figure 1).

The trend of the village funds (DD)

for 2004-2015 period for 33 provinces in Indonesia. Data analysis by. Spatial panel data takes into account spatial elements, that is distance and space. Each region has a neighbor that is projected in the proximity matrix, where the neighboring province reflects the proximity of transportation connectivity. The distance of shipping between ports was used as a spatial weight matrix.



**Figure 2. Fiscal Transfer from Central to Regional Government, 2015-2019**

Source: data DJKP (Directorate General of Financial Balance (2015-2019))

which the central government has transferred to local governments over the last five years also shows an increase of about 50.50 percent. On the contrary, revenue sharing fund, which reflects regional productivity, shows steep decline of (-3.59 percent). Despite the fact that DAU is still the largest component of the central government allocation to local governments, it only registered growth of 16 percent during 2015-2019 period, while, DAK increased by nearly 500 percent (459 percent) during the same period. (Figure 2).

## METHODS

The study used a quantitative research design that entailed using econometric spatial model of panel data of government revenues

With the help of NETPAS software, it is easier to calculate the distance and travel time of shipping between ports, through several drop-down menus, and shipping routes.

Data was obtained from the National Statistics Center, the Director-General of Fiscal Balance of the Ministry of Finance (DJPK). Data included transfer funds from the central government to provincial per capita GRDP, investment, number of workforce employed in productive activities and export and import sectors during 2004-2015 period.

## Regional Economic Growth Models

The analysis of regional economic growth is based on the dynamic macroeconomic model (Blume & Sargent, 2015),

which was initially developed by Harrod (1939) and Domar, (1946). is the a need basis for. Hartman & Seckler (1967) improved the model by including variables incorporate the connectivity between productivity, improvement, and innovation development as follows:

$$Y_{tr} = C_{tr} + I_{tr} + E_{tr} - M_{tr}^c - M_{tr}^k \quad 1$$

$$C_{tr} = bY_{t-1,r} \quad 2$$

$$I_{tr} = c(Y_{t-1,r} - Y_{t-2,r}) \quad 3$$

where;

$Y$ ,  $C$ , and  $I$  = income, consumption, and investment in the area  $r$  and at time  $t$ .

$M_{tr}^k$  = import of consumer goods, and,

$M_{tr}^c$  = import of capital goods,

$E_{tr}$  = export of goods.

Based on Harrod-Domar regional economic model in equations 1, 2, and 3 (Bennett Robert J and Hordijk Leen, 1986), shows that the region's initial income is a key determinant of the region's income, size of labor force, investment, exports, and imports. This paper, the regional economic model is based on the New Economic Geography (NEG) and endogenous framework, which includes the cost that is represented by distance as an

endogenous variable. Based on Harrod-Domar's model, deterrments of regional economic growth influence income in the region as well as that of neighboring regions.

$$Y_{tr} = y_{t-1,r} + MP_{tr} + I_{tr} + E_{tr} - M_{tr} \quad 4$$

Where:

$Y_{tr}$  = the level of observed provincial economic income in the year  $t$

$y_{t-1,r}$  = the level of observed provincial economic income in the previous year

$MP_{tr}$  = the number of observed workforce in the year  $t$

$I_{tr}$  = the value of the observed provincial investment in the year  $t$

$E_{tr}$  = f the observed export value for the province in year  $t$

$M_{tr}$  = the observed import value for the province in the year  $t$

$t$  = the time of observation

$r$  = the province

If there is spatial autocorrelation of provincial per capita income, equation 4 is analyzed by calculating the spatial elements in the dependent variable, independent variable, error term, or a combination. That is, select the best model that explains the level of income per capita of 33 provinces in Indonesia during 2004-2015 period.

Regional economic growth takes into account the spatial element, which underscores

the reality that the output of any given province is determined by both economic variables in the province as well as those in neighboring regions. This is in line with Maxim of Geography (Tobler, 1970) that states that "Everything is related to everything else but near things are more related than distant things."

### Spatial Autocorrelation Tests

Prior to conducting further analysis, using the model, there is need to ascertain whether or not the model has spatial autocorrelation problems. If there is no spatial autocorrelation, then the model is analyzed by non-spatial standards and otherwise if the model shows spatial autocorrelation, then, is the model specification takes into account the spatial element. Testing for the existence of spatial autocorrelation, involves using the Moran index (Getis, 2007). However, in this paper, the spatial dependence test does not depend on the spatial weight matrix. To that end, Breach-Pagan LM test was used, instead.

### Breach-Pagan LM Test

According to Breusch, T., & Pagan (1979), the Lagrange (LM) multiplier statistic used to test the zero correlation of the zero cross-correlation equation, which is very easy to calculate. This test is based on the following LM statistics:

$$CD_{lm} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij}^2$$

5

where  $\hat{\rho}_{ij}^2$  is the sample estimate of the

pair-wise correlation of the residuals. Specifically,

$$\hat{\rho}_{ij} = \hat{\rho}_{ji} = \frac{\sum_{t=1}^T e_{it} e_{jt}}{(\sum_{t=1}^T e_{it}^2)^{1/2} (\sum_{t=1}^T e_{jt}^2)^{1/2}}$$

6

And,  $e_{it}$  is the ordinary least squares (OLS) estimate of  $u_{it}$  defined by

$$e_{it} = y_{it} - \hat{\alpha}_i - \hat{\beta}_i' x_{it}$$

7

With  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  being the estimate of  $\alpha_i$  and  $\beta_i$  computed using the OLS regression of  $y_{it}$  on an intercept and  $x_{it}$  for each  $i$ , separately. Unlike the spatial dependence test, the LM test is more generally applicable and does not require a particular ordering of the cross-section units. However, it is valid for  $N$  relatively small and  $T$  sufficiently large. In this setting Breusch, T., & Pagan (1979) show that under the null hypothesis of no cross-section dependence, specified by

$$cov(u_{it}, u_{jt}) = 0, \text{ for all } t, i \neq j$$

8

With,  $\hat{\rho}_{ij}^2$ ,  $i = 1, 2, \dots, N-1$ ,  $j = i+1, 2, \dots, N$ , being asymptotically independent, the following scaled version of  $CD_{lm}$  can be used to test the hypothesis of cross dependence even for  $N$  and  $T$  large;

$$CD_{lm} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T \hat{\rho}_{ij}^2 - 1)$$

9

### Pesaran Cross Dependence Test

Using the formula proposed by Pesaran, (2004). The Cross-Dependence test is calculated based on the covariance unit error value, which has a zero value.



In the standard panel data model, it is assumed that there is cross-section correlation between the observed variables and those that are not in the model. The null hypothesis is that the error terms are cross-section correlated but are assumed to be independent and identically distributed (*iid*) in the period *t* and cross-section observation units (Pesaran H., 2004; Sarafidis & Wansbeek, 2012).

$$\rho_{ij} = \rho_{ji} = Cor(v_{it}, v_{jt}) = 0, \text{ for } t, \text{ and } i \neq j \tag{10}$$

Where,  $\rho_{ij}$  ( $\rho_{ji}$ ) is the error term correlation coefficient between the observation units *i* and *j*. which indicates there is a cross-section dependence on variables that are not observed. For test hypothesis 0, the cross-sectional dependency test used, namely:

$$PCD_{LM} = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j+1}^N \hat{\rho}_{ij}^2 \tag{11}$$

Where,  $\hat{\rho}_{ij}$  is the estimated term error correlation of the observation unit of area, and

$$\hat{\rho}_{ij} = \hat{\rho}_{ji} = \frac{\sum_{t=1}^T \hat{v}_{it} \hat{v}_{jt}}{(\sum_{t=1}^T v_{it}^2)^{1/2} (\sum_{t=1}^T v_{jt}^2)^{1/2}} \tag{12}$$

Unlike the LM test statistic  $PCD_{lm}$ , cross-section dependence LM in the formula 11 above has exactly mean zero for a fixed value of T and N. Under a broad class of panel data models, including heterogeneous dynamic models, subject

to multiple breaks in their slope coefficients and error variances, so long as the actual means of  $y_{it}$  and  $x_{it}$  are time-invariant, and their innovations symmetrically distributed.

### Spatial Durbin Model

The SDM is spatial autoregressive model of a special form, including not only the spatially lagged dependent variable and the explanatory variables, but also the spatially lagged explanatory variables (Sarrias, 2017). The advantage of this model is that in addition to the magnitude of the impact of the determinant variables on regional economic per capita income, this model also provides a reverse estimate.

Spatial panel data of SDM

$$y_{it} = \lambda \sum_j w_{ij} y_{it} + \alpha_i + \beta_0 \sum_j w_{ij} y_{it-1} + \beta_1 \sum_j w_{ij} \beta_2 \sum_j w_{ij} I_{it} + \beta_3 \sum_j w_{ij} E_{it} - \beta_4 \sum_j w_{ij} M_{it} + V \tag{13}$$

Where;

$y_{it}$  = the level of observed provincial economic income in the year *t*

$\lambda$  = spatial parameter

$w_{ij}$  = spatial weight

$\alpha_i$  = spatial lag

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$  = value estimate of variable determinant

$y_{it-1}$  = the level of observed

$MP_{tr}$  = the number of observed workforce in the year  $t$

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$E_{it}$  = the export value of the observed province in year t

$M_{it}$  = the import value of the observed province in the year t

$V$  = element error

$i$  and  $j$  = the province observed and neighbors respectively

**Table 2 Panel Data Results of the Economic Growth of 33 Provinces in Indonesia in the periods 2004-2015**

Parameter	Pooling	Fixed Effects one-way	Fixed Effects two-ways	Random Effects
F Test		21,225 ( $<2.2e-16$ ) <sup>***</sup>	22.4 ( $<2.2e-16$ ) <sup>***</sup>	
LM Test (Breusch-Pagan)	15,338 ( $2.2e-16$ ) <sup>***</sup>	64,092 ( $1.187e-15$ ) <sup>***</sup>	253,33 ( $<2.2e-16$ ) <sup>***</sup>	
Pwar-Test		2,6954 (0,1015)	2,6954 (0,1015)	
Pcd-Test (d=500 km)		15,273 ( $<2.2e-16$ ) <sup>***</sup>	5,472 ( $4.45e-08$ ) <sup>***</sup>	
(d=2000 km)		33.743 ( $<2.2e-16$ ) <sup>***</sup>	16.073 ( $<2.2e-16$ ) <sup>***</sup>	
Hausman-Test				194.09 ( $<2.2e-16$ ) <sup>***</sup>

Significant: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

$\alpha_i$  = spatial lag

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$  = value estimate of variable determinant

$y_{it-1}$  = the level of observed

## RESULTS AND DISCUSSION

Results of the analysis of the traditional panel data model specified in equation 4 are presented in Table 2 that shows independence error term between provincials in the

model. The LM test estimation results show provinces and time effects (chi-squares =  $\rho < 0.001$ ). Variables in the fixed effect model show the correlation between provinces indicated by the value of chi-squares in Wooldridge's test in the model ( $\rho < 0.1$ ). The cross-sectional dependence between provinces based on the results of the Pcd test (Pesaran cross-section dependence), which reinforces the conclusion of heteroscedasticity between provinces in the model ( $\rho < 0.001$ ).

The model specification showed heteroscedasticity and correlation. Thus, economic growth of the 33 provinces in Indonesia showed evidence of spatial autocorrelation. In other words, the economy of a province is directly and indirectly influenced by

pretation. Table 3 shows the estimated results of income per capita for the 33 provinces based on the panel data model (equation 13).

Table 3 shows that the value of exports and imports has a significant positive effect on provincial income in Indonesia. Nonetheless, the impact of exports on provincial income per capita is weak. An increase of US \$ 1 million in exports and imports, increases provincial economic income by 3.42 percent, and 4.10 percent, respectively. The impact of neighboring provinces on the economy of a certain province, which occurs spatially through investment and size of workforce, shows a positive and significant influence on provincial per capita income. Lagged values of spatial investment

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Parameter	Pooling	Fixed Effects one-way	Fixed Effects two-ways	Random Effects
F Test		21,225 ( $<2.2e-16$ ) <sup>***</sup>	22.4 ( $<2.2e-16$ ) <sup>***</sup>	
LM Test (Breusch-Pagan)	15,338 ( $2.2e-16$ ) <sup>***</sup>	64,092 ( $1.187e-15$ ) <sup>***</sup>	253,33 ( $<2.2e-16$ ) <sup>***</sup>	
Pwar-Test		2,6954 (0,1015)	2,6954 (0,1015)	
Pcd-Test (d=500 km)		15,273 ( $<2.2e-16$ ) <sup>***</sup>	5,472 ( $4.45e-08$ ) <sup>***</sup>	
(d=2000 km)		33.743 ( $<2.2e-16$ ) <sup>***</sup>	16.073 ( $<2.2e-16$ ) <sup>***</sup>	
Hausman-Test				194.09 ( $<2.2e-16$ ) <sup>***</sup>

determinants of economic growth in neighboring provinces. After establishing the existence of spatial autocorrelation in the model, the analysis proceeded by calculating the spatial elements to obtain the correct inter-

and labor force influence provincial per capita income by 2.55 and 2.22, respectively. If one transaction of export-import activities can employ 1000 people, it could generate Rp.2,220 million in per capita income for the

**Table 3. Estimate Durbin Spatial Model (HR) for Regional Per Capita Income**

Parameter	Estimate	Std-Error	t-value	Pr (>  t )
Intercept	8,4712e+03	6,0484e+03	1,4006	0,1613458
Initial Income	3,7326e-02	4,2411e-02	0,8801	0,3788013
Workforce	2,9538e-03	4,4406e-01	0,0067	0,9946927
Investment	-4,2094e-02	4,2199e-01	-0,0998	0,9205423
Export	3,1796e-01	1,6759e-01	1,8972	0,0577851,
Import	3,8093e-01	8,0656e-02	4,7229	2,325e-06***
Spatial Lag Independent				
Initial Income	-1,6235e-02	5,6789e-02	-0,2859	0,7749740
Workforce	2,2218e+00	9,4147e-01	2,3599	0,182781*
Investment	2,5466e+00	7,6970e-01	3,3086	0,0009376***
Export	2,0062e-01	3,0954e-01	0,6481	0,5169069
Import	-2,1161e-01	1,5496e-01	-1,3656	0,1720603
Spatial Autoregressive				
Lambda	0,187671	0,062424	3,0064	0,002644**
Error Variance				
Phi	15,7873	4,7367	3,333	0,0008591***

Significant: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 '.' 1

province. Meanwhile, an area that can absorb US \$ 1 million in investment can contribute to an increase of Rp 2,550 million in per capita income. Thus, provincial per capita income of every province is influenced by the value of exports, imports, and per capita income of neighboring provinces.

The value of lambda 0.18 shows the magnitude of correlation between exports and imports on one hand and per capita income across provinces on the other. The same applies with respect to investment and labor force in other regions. The value of the spatial correlation of per capita income between regions is small because mining and

vegetable oils, which dominate the flow of exports occur between the exporting or importing province and the country that is destination of exports and source of imports, respectively. Thus, there is no cross-province linkages Inter sectoral linkage plays an important part in stimulating regional economic growth, that in turn increases investment and workforce, that subsequently lead to poverty reduction.

However, revenue in the previous year did not have significant influence on provincial economic growth. The implication is that fiscal decentralization policy implemented during successive reformation

regimes has not induced improvement in per capita income. Table 3 shows that any additional 1 million rupiahs in regional income only increases regional per capita income by Rp.37,000 per year. Provinces that benefited the most from transfer funds in terms of increase in income per capita were those with initial low per capita GRDP, such as Jambi, Bengkulu, Lampung (0.64 percent, 0.76 percent, and 0.74 per-

lawesi (0.91 percent). Likewise, Maluku registered 1.28 percent, and North Maluku (1.26 percent). The impact of per capita income in the previous year in 18 other provinces ranged from 0.35 percent to 0.58 percent. Whereas provinces with high per capita GRDP, such as Riau Islands, DKI Jakarta, and East Kalimantan, transfer funds had little impact on per capita income, increasing it by an average of 0.11 percent.

**Table 3. Spatial Characteristics of 33 Provinces**

<i>Neighbour list object</i>	<i>Distance</i>
	500 km
Number of Provinces	33
Number of nonzero link	232
Percentage nonzero weights	21,30395
Average number of links	7,030303
Link number distribution	1 2 3 4 5 6 7 8 9 10 11 12 13 1 1 4 1 5 4 3 2 3 3 3 2 1
least connected	Papua with 1 link
most connected	East Java with 13 link
Weights style	W
Weights constant	n= 33 nn=1089 S0=33 S1=14.0179 S2=137.3453

cent, respectively). Meanwhile, Central Java registered 0.66 percent and DI Yogyakarta showed 0.61 percent. For eastern Indonesia, the transfer of funds has positive impact on per capita income. For example, for NTT and NTB provinces, the transfer of funds contributed to an increase of 1.39 percent and 0.90 percent in GDP per capita, respectively; Southeast Sulawesi showed 0.69 percent, Gorontalo (1.32 percent), and West Su-

**How Fiscal Decentralization Should Work**

Results show spatial interdependence across provinces which is reflected in links that each province has with others (Table 3). Provinces located on East Java island showed the largest number connections with other provinces (13 links), while Papua located in Eastern Indonesia, has the least number of

The components of fiscal decentralization consist of Local Taxes (Tax assignment), Revenue Sharing Funds, and DAU & DAK (grants). Regional economic income comprises; first, Local Taxes as a source of local government income. Due to differences in tax authority applicable in different provinces, PAD varies between provinces. Secondly, provinces receive an allocation of revenue sharing funds that consists of 1) national income tax, which includes BPHTB, land and building tax, tobacco product excise tax; 2) Natural resource revenue sharing funds, which include, oil and gas, minerals and coal, forestry, fisheries, and geothermal. In addition, provincial governments receive grants in the form of the General Allocation Fund (DAU) and the Special Allocation Fund (DAK). All the three constitute components of regional income per capita, as shown in Table 2 above, regional income in the previous period only contributed around 3.7 percent. Suppose the PAD contributes about 24.6 percent to the regional budget (based on DJPK data for 2015), then the transfer funds only induce an increase of 2.79 percent in the revenue, and 0.91 percent PAD for the province. Thus, the magnitude of the influence of fiscal transfer on regional per capita income in this research are lower those obtained by Darmi, (2018). Darmi (2018) findings showed that transfer of funds from the central government to Bengkulu province increased gross regional domestic product 3 percent. The finding underscores the fact that that the transfer funds

by the central government to provincial governments does not induce high economic growth because of low regional capacity to generate income.

The devolution of authority by the central government to local governments is based on the assumption that the latter are spatially closer to natural resources and residents than the former, hence an important rural development capital. To achieve that goal, the central government provides much money in the form of grants as financial capital to support local government in the management of natural resources and the population. However, in reality, policies and strategies that should strengthen the autonomy of regions have not emerged or developed, meaning that regions remain economically dependent on the center.

Consequently, the results of decentralization are sometimes contrary to those expected. The case of Bolivia is a good example. Faguet (2004) found that the proportion of funds for the management of agricultural priority sectors in Bolivia decreased in the aftermath of fiscal decentralization, even fall below the level before devolution era, which was about 10 percent. To that end, decentralization did not positively impact on rural economy improvement, due to several obstacles, including, weak financial management capacity, and high political pressure at higher levels of government. It is also possible that the decentralized system's failure maybe since the idea of implementing the policy not based on economic



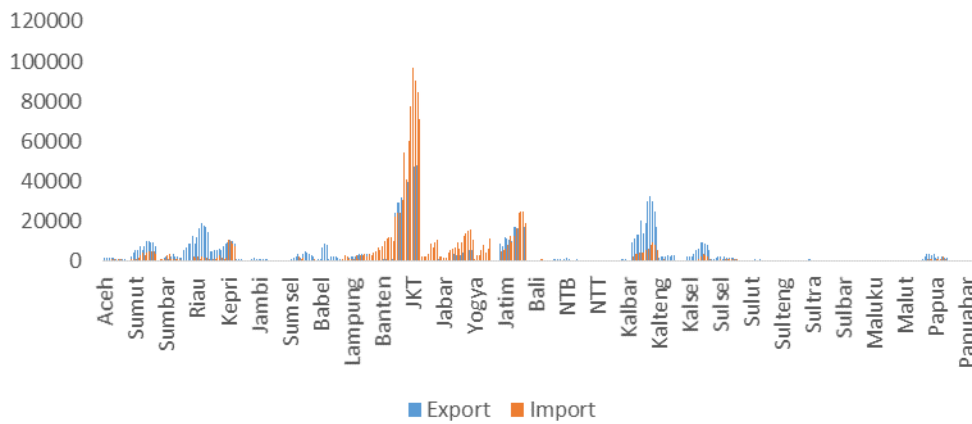
considerations of improving the social welfare of the citizenry but rooted in political interests. The Results on the implementation of fiscal decentralization in Indonesia (Fossati, 2016) identified some weaknesses, specifically the social security policy. Fossati (2016) found that including poor JAMKESMAS policy, which aimed to increase and improve access to the poor to healthcare, is plagued by problems because it is politically nuanced in Indonesia. Specifically, the policy's objective was to attract electoral votes from the local population rather than improve their health. That is common in developing countries that are plagued by weak institutions and political conflicts.

Moreover, the impact of decentralization on poverty does seem to depend much on the level of physical capital or infrastructure of the country. This is contrary to what policy makers do in implementing decentralization policy, which is developing infrastructure projects instead of creating opportunities and productive activities that disproportionately benefit the poor. Thus, the study has two important political lessons (Jütting et al., 2011). First, the central government is not fulfilling its essential functions. Decentralization can be counterproductive and, therefore, should not prioritize making donations, rather building capacity. Second, in countries that fulfill their functions, decentralization can be a powerful tool in poverty reduction, through creating opportunities for the representation of the poor, that in turn offers them voice in public policy process

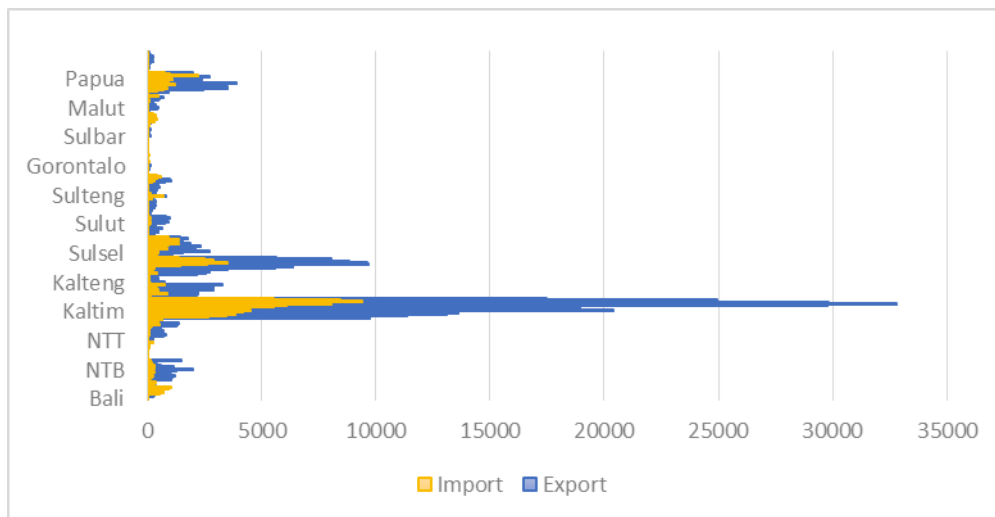
that leads to improvement in service delivery.

Fiscal transfers do not generate results that are expected based on the goals of the decentralization policy. Based on the results of this study, exports and imports are the key determinants of economic growth. This finding corroborated in (Krugman, Obstfeld, & Melitz, 2012) that productivity is the dominant factor driving regional economic growth. Based on the Indonesia's trade composition during the 2004-2015 period, imports were higher than exports, indicating that negative terms of trade occurred. Indonesia's trade balance for the period 2004-2015, as shown in Figure 1, was adverse hence inimical to Java region and parts of Sumatra (West Sumatra, Riau Islands, Jambi, Bengkulu, and Lampung) for several years. For provinces in eastern Indonesia (Figure 2), the average value of exports was higher than imports, attesting to favorable terms of trade. The only problem was that the value of exports was weak for many provinces, except for Kalimantan and Papua regions. To that end, the transfer of funds to the regions has not been able to enhance the productive sectors of the local economies, which would have contributed to an increase in local income sources that would have reduced dependency.

Rice is the staple foodstuff for the Indonesian population. Some provinces depend on supplies of rice from other provinces because of lower local production than demand. Thus, food commodity supply



**Figure 1. Balance of Trade for the Period 2004-2015**  
*Source: BPS (2004-2015)*



**Figure 2. Balance of Trade in Eastern Indonesia (2004-2015)**  
*Source: BPS (2004-2015)*

chain attests to the existence and importance of spatial economic linkages across provinces. Key domestic rice production in Indonesia include Java, specifically, Eastern Java, West Java and Central Java; South Sulawesi, South Sumatra, North Sumatra and Lampung. Based on 2015 production figures, Java contributes about 51.69 percent to domestic rice production is in, followed by

Sumatra (24.35 percent). Sulawesi produces (11.43 percent) Kalimantan (6.41 percent), while Bali-Nusa Tenggara and Maluku-Papua (about 5, 59 percent and 0.54 percent, respectively). Assuming 1 ton of harvested dry grain produces approximately ½ ton of rice, for the 2015 period, the domestic rice production would be approximately 37,698,920.5 tons.

The quantity of rice consumption needs per person per year is 114.6 kg/capita, so the total rice demand for 2015 would be 29, 27 million tons. That would mean that Indonesia produces more rice than the quantity consumed by its population. However, some provinces such as Riau Islands, Jambi, and Bangka Belitung are not able to produce enough rice to meet demand. To meet the shortfalls between local production and demand, such provinces buy rice from other provinces to the tune of 489375.4827 tons. Neighboring provinces with excess rice production over local demand, include North Sumatera and Riau. Meanwhile, for Bangka Belitung, Lampung is the province that has surplus rice production, implying that it can serve as a supplier for neighboring provinces that consume more rice than they produce such as Bangka Belitung (Table 3 above).

Meanwhile, rice demand in DKI Jakarta and Banten provinces is 1430901,432 tons. The shortage of rice in the two provinces is offset by supplies from East Java, West Java, and Central Java provinces which are rice producers on Java island. Bali, East Nusa Tenggara, and East Kalimantan are other provinces that do not produce enough rice to meet local demand, hence have to source the shortfall from surplus rice producers such as South Kalimantan. Maluku, North Maluku, Papua, and West Papua provinces get rice supplies from Sulawesi, South Sulawesi, in particular.

Ideally, each province should be able to produce enough rice to meet local de-

mand. If DAU funds were diverted to rice production, by increasing investment in irrigation improvement (Arif & Maksum, 2017), rice production will increase. Higher local rice production should lower rice prices for consumers. Increase in rice production in the province have positive impact on provincial real per capita income. With real per capita incomes rising, investors in the provincial economy will increase to supply capital that can be used to support and strengthen productive sectors in the province. Besides, excess production can be exported to neighboring countries, generating foreign exchange revenue than can support imports of intermediate raw materials that are used in domestic productive activities. To that end, encouraging exports is important to increase provincial local income generation. Furthermore, improvement in designing policies should increase local income, which in turn strengthens local revenues (Ramírez et al., 2017). Figure 3 shows the effects of DAU funds on productive sector activities through spatial interconnection between provinces in Indonesia:

## **CONCLUSION**

Fiscal decentralization in the form of transfer funds from the center to the regions has a significant and positive impact on increasing regional economic income. Nonetheless, fiscal decentralization is more often than often motivated by political objectives rather than economics of efficiency and the normative goal of mitigating inequality. Evidence of this is attested by the inefficiency

that plagues DAU allocation, most of which is spent on personnel remuneration and related items. Research results showed that the transfer of funds by the central government to the provinces increases income per capita by only 2.78 percent. Findings also showed that fiscal balancing or transfer funds has not been able to stimulate improvement in productive sector in the provinces. This is reflected by the low contribution of PAD (revenues) (0.91 percent) to provincial expenditure. This reflects low provincial productivity. To that end, the impact of fiscal policy that focuses on the financing infrastructure, education, and health does contribute fundamentally to improving production capacity in recipient provinces. If one of the goals of fiscal decentralization was to reduce income disparity between provinces one hand and between Eastern and Western Indonesia, then that goal remains elusive as inequality remains a serious problem across provinces and between Eastern and Western Indonesia.

Exports and imports play a primary role in increasing regional income per capita. Thus, fiscal balancing funds should be allocated to the productive sectors that produce goods and services that meet the needs in the province as well as those in neighboring provinces. The paper proposes adopting policies that enhance inter provincial interconnectedness and interdependence with respect to labor, capital, and trade. Strengthening interdependence among provinces, which is already high as evidenced by the existence

of spatial correlation, should help in creating production flows and market demand both at home and abroad. This will enable each province to specialize in the production of goods where it has the highest competitive advantage leading to high quantities that are produced efficiently, that in turn will enhance provincial and country competitiveness. That way, while each province in part will depend on neighboring provinces for goods it does not produce, high production in each province will lead to lower prices due to higher productivity, economies of scale, that in the end will enhance provincial income and by extension, per capita provincial income. Second, there is need for policy makers to treat farmers and fisherfolks as government employees who receive compensation because they play a pivotal role in ensuring domestic food security. To enhance the potential benefits of decentralization, donor intervention should focus on providing technical support as well as strengthening political coordination of the assistance at the local and national level. Specifically, as fiscal decentralization, mediated by exports, shows stronger influence on per capita income in provinces in eastern Indonesia, the focus should be on improving drivers of value of exports as doing will contribute to increasing provincial income, which in turn will lower regional economic disparity.

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**Appendix**

**Table 4. Province Average GDP Per Captita and Precentage of Trans-**

Province	Average GRDP per capita	%Pend-i(transfer funds)
Aceh	7,997	0,004627
Sumut	8,957583	0,004131
sumbar	7,957917	0,004649
Riau	17,57217	0,002106
Kepri	25,53675	0,001449
Jambi	5,7295	0,006458
Bengkulu	4,839833	0,007645
Sumsel	8,613583	0,004296
Babel	8,9785	0,004121
Lampung	5,027583	0,007359
Banten	8,126833	0,004553
Jakarta	41,23783	0,000897
Jabar	7,496417	0,004936
Jateng	5,630333	0,006572
Yogya	5,971083	0,006197
Jatim	9,040833	0,004093
Bali	7,548167	0,004902
NTB	4,1265	0,008966
NTT	2,66925	0,013862
Kalbar	6,843667	0,005406
Kaltim	32,4385	0,001141
kalteng	8,545	0,00433
kalsel	7,50775	0,004928
sulsel	6,33075	0,005844
sulut	7,857583	0,004709
sulteng	6,818167	0,005427
sultra	5,318417	0,006957
gorontalo	2,80625	0,013185
sulbar	4,0845	0,009059
maluku	2,882083	0,012838
malut	2,924667	0,012651
papua	8,66125	0,004272
papuabarat	10,66025	0,003471