CONVERGENCE AND ECONOMIC GROWTH IN THE DISTRICT IN EAST JAVA: SPATIAL ECONOMETRIC APPROACH

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ABSTRACT

Sustainable development is the goal of a country and human capital is one of the important factors for achieving sustainable economic growth. East Java as one of the major provinces with high economic growth was central to the eastern region of Indonesia that has a fairly high economic significance, which contributed 14.71% to the national Gross Domestic Product. This study aims to analyze the main factors forming regional economic growth and convergence in a District in East Java 2004-2012 by considering spatial aspects. Analysis of convergence is conducted by using the sigma convergence and beta convergence. Dynamic panel model is used in this study in which the value of lag of the dependent variable becomes part of the model.The method of analysis in this study uses spatial econometric analysis tools least squar panels, as well asthe systemGeneralized Method of Moment (SYS-GMM). Analysis of the spatial econometrics in this study uses the*system*GMM due to the emergence of endogeneity problems in the growth model and in particular on the dynamic panel model.Human capital which consists of education (the average length of school) and health (life expectancy) becomes one of the main factors affecting economic growth.In addition, the spillover effects are shown from the interaction between regions so that the mobilization of production factors occured.

Research results with sigma convergence has been converging in the district in East Java.Non-spatial approach in the form of absolute and conditional beta convergence and spatial approach with*system*GMM prove that there is no convergence in the District in East Java.Spillover effect of the determining factors of economic growth, especially human capital to economic growth in East Java is not shown to occur.The existence of abundancefactor that occur in a spatial model of this study is proved exist in the population abundance variables.

Keywords: Economic Growth, Human Capital, Convergence, Spatial Econometrics

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INTRODUCTION

The belief in the existence of trickle-down effects in development process has become policy makers' cornerstone over the years. The belief directs development strategies to focus on achieving a high rate of economic growth in a short period. The negative consequencethat ultimately appears (based on the experience of the new order) is that the center of national and regional economic development is started in sectors that are potentially capable of producing high added value, especially the industrial and service sectors. Development is also focused on areas that have had more adequate infrastructure, especially in East Java. This makes trickledown effects not really applicable, but rather to the indication of trickle-up effects. In fact, it reachesonly high economic growth, but growth with equity is still far from expectations. Thus, income inequality between regions arise in the development process over the years.

It is inevitable that the gravity of economic activities is still located in Java. Investment, either Foreign Direct Investment (FDI) or Domestic Investment (DCI), also tends to be concentrated in Java Island. East Java, once ranked first in the highest number of projects in 2008 that shifted Jakarta position in 2005. In addition to the province with the highest number of projects, East Java is the largest area among the six provinces in the island of Java and has the greatest number of regencies/cities in Indonesia. East Java as the center of eastern part of Indonesia has a fairly high economic significance, which contributed 14.71% to the national Gross Domestic Product in 2010. In late 2010, the economic growth in East Java had increased, reaching 6.67%. The high rate of growth exceeded the national growth of only 6.10%. Contribution of Java Island to to the National GDP is, indeed, the biggest compared to other islands, and East Java contributes the second largest after Jakarta.

Spatial or neighboring aspect in the analysis of regional economy is an important thing that cannot be ignored because the interactions between regions inevitably occur. Thus, the aspect of geography in economic analysis is important because of the industry concentration, the concentration of human capital, mobility of production factors that can make the economy of a developing area grow. The basic idea about it originates from Tobler (1970), known as Tobler's first law of geography, that is: "Everything is related to everything else, but near things are more related than distant things" (Anselin, 1988). Mobility of productionfactors, trade relations and geographical abundance (such as the deployment of technologies) can be a reference

of how to understand the economic development of a region that is affected by the neighboring areas (Baeur and Matthias, 2010).

Spatial aspect becomes one important point in analyzing the relationship between human capital and economic growth in East Java. This research is focuses on the spatial analysis of the condition of human capital and economic growth in East Java using spatial econometrics. The main points that would be analyzed in this study are a flow that is carried out in sequence, that is, to analyze the conditions for the distribution of regional economic growth and human capital in East Java

LITERATURE REVIEW

Human capital has a central role in economic development. Sustainable development is thegoal of a country, so the role of human capital is one of the important factors for achieving sustainable economic growth. Cohen and Soto (2007) argue that the idea that human capital can lead to sustainable growth is one of the criticisms emerged from the "new growth" literature initiated by Lucas (1988) and Romer (1990). The concept of human capital is generally defined as the knowledge and expertise owned by humans. According to some economists such as Becker (2002), human capital is defined as knowledge, information, idea, skill and health of an individual. The individual's economic success and the overall economy depend on how extensive and effective people invest in themselves. Meanwhile Acemoglu and Autor (2005) defines human capital as a matter related to the stock of knowledge or characteristics of labor owned (either congenital or acquired) that give contribution, that is, "productivity".

Convergence is one of the advanced studies of the theory of economic growth. The implication of the theory of economic growth is the difference in the rate of economic growth of a country with other countries. According to Islam (2003), the income levels of poor countries will be convergent towards the rich countries by themselves, so this has implications on human well-being. According to Barro and Martin (2004), one of the predictions of the modelsof Solow (1956) and Swan (1956), which have seriously been used as an empirical hypothesis only in recent years is the occurrence of conditional convergence. The lower levels of GDP per capita are the relative beginningsto the long-term or steady-state position, so the rate of growth goes faster and faster. The importance of analysis at the regional level in a country is to see local development and the effectiveness of policies that have been made by the government on the development of key sectors of growth.

Convergence in the spatial model is a condition in which the interaction between regions is one factor that leads to the economic growth of a region. According to Fingleton (2006), the model of speed of convergence of a region depends on the location and can be decomposed into precisespeed of convergence, the remoteness of a region in its influence, and the effects of the initial gap. Thus, in the model of convergence, the linkage of initial conditions is one part of spatial relationship.

Methodological and empirical development in spatial econometric provides complexity of model analysis in the intensity of space and time. Dynamic analysis with spatial econometric methods provides an analysis that space and time linkagesbecome important. The study by Elhorst et al. (2010)gives an analysis of the dynamic aspects between space and time regarding economic growth and the methodological and empiricalconvergence in the European Union. Studies by Agha and Vedrine (2010) provide a methodological analysis of the spatial, dynamic model of convergence in Europe using Spatial Autoregressive Model (SAR) and Spatial Error Model (SEM).

METHODOLOGY

The unit of analysis in this research is at the levels of regencies and cities in East Java. This study used panel data, that is, data combination between cross section and time series. Panel data used is 38 Regencies and Cities in East Java with annual data for the period of 2004 to 2012. The data used in this research came from the publication of the Central Statistics Agency (BPS). The variables used were GRDP per capita, GRDP per capita in the initial Condition, growth rate at the level, Foreign Direct Investment, Domestic Investment, population density, life expectancy, and fiscal decentralization.

The research used traditional approach, that is, general spatial weight matrix based on geographical observation, designating a region as a 'neighbor' when they are borders each other (binary countigunity matrix). According to the criteria of proximity, spatial weights matrix element (wij) is one if the location $i$is close to the location j, and zero otherwise. For easy interpretation, spatial weighting matrix is standardized, so the elements of a number of lines value one. w_{ij}=0; if i=jw_{ij}=0 ; if i no border j dan w_{ij}=1 ; if i border with j. Thus, the matrix W in this research will

form the matrix $ixj$with shape in cross section and on a panel model of human capital, economic growth and convergence are the matrix $w_{ij}N_j = 1$.

Thespillover effect of human capital to the growth of regional economyis due to the existence of spatial effects. Several studies with dynamic spatial model like Elhorst et al. (2010) use Solow-Swan model modified into a dynamic spatial model, and Agha and Vedrine (2010) develop a model of Mankiw et al. (1992). This research develops the basic model of Caselli et al. (1996) in the context of spatial, dynamicanalysis, modifying the static model of Fischer et al. (2009) and Ramos et al. (2010) on the Spatial Durbin Model (SDM) to search for spillover effects for each variable i.e. physical capital, human capital and the impacts of control variables on economic growth. The model is used in the model of regional economic growth. Thespecification of the model is presented below.

$$lnY_{it} - lnY_{it-1} = \varphi t + \alpha 1 lnY_{it-1} + \gamma X`_{it} + \mu_i + \varepsilon_{it} \quad (1.1)$$

By moving $lnYit$-1 to the right side of the equation, then:

$$lnY_{it} = \varphi_t + \gamma 1 lnY_{it-1} + \gamma X`_{it} + \mu_i + \varepsilon_{it} \quad (1.2)$$

Where $lnYit$ is log output per capita in the region i and time$t$, lnY_{it-1} is log output per capita in the region i and time t-1. Variables$lnINV_{it}$, $lnRLS_{it}$, $lnAHH_{it}$ and X_{it} are log of physical capital stocks, the average log of schoollength, log of life expectancy, and the control variable of DCI and FDI values. The effect of specific models φt, μi, εit is time-specific effect, the specific effect of regencies and cities, errorsin regency or city i and time t and γy value is $1 + \alpha t$.

The basic model above is developed by adding major factors forming economic growth. The basic model is developed by taking into account the importance of human capital as the former of economic growth, so the model is developed into a model of development as follows.

$$lnY_{it} = \gamma_y lnY_{it-1} + \beta_{inv} lnINV_{it} + \beta_{rls} lnRLS_{it} + \beta_{ahh} lnAHH_{it} + \beta_x X_{it} + \varphi_t + \mu_i + \varepsilon_{it} \quad (1.3)$$

Where $lnYit$ is log output per capita in region $i$and timet, $lnYit$-1 is log output per capita in the region i and time t-1. Variables$lnINV_{it}$, $lnRLS_{it}$, $lnAHH_{it}$ and $X_{it}$are log of physical capital stock, the average log of schoollength, log of life

expectancy, and the control variables are in the form of DCI and FDI values. The effect of specific models φt, μi, εit is time-specific effect, the specific effect of regencies and cities, and the error in regency i and time t and γy value is $1 + \alpha t$

Sigma convergence can be measured using a measure of dispersion. In analyzing the convergence of human capital, physical capital and regional productivity, the degree of dispersion is measured by calculating the standard deviation (SD) and coefficient of variation (CV) of the logarithm of each variable. If the coefficient of variation or the standard deviation of a given year is smaller than the previous year, the sigma convergence occurs andvice versa if the coefficient of variation or the standard deviation of a given year is greater than the previous year, the sigma convergence does not occur.

The model used to analyze the absolute beta convergence on each estimated variable is:

$$lnY_{it}=\beta y lnY_{it-1}+\alpha_t+\mu_i+\varepsilon_{it}$$

(1.4)

Where $lnYit$-1 is the value of the initial conditions of each variable to be observed, $lnY_{it}$is the value of variable $lnYitY$, $\beta y$is the estimated a parameter with value $1 + \beta y$, αt is time specific effect, μ_i is specific effect of regencies and cities, $\varepsilon_{it}$is error in the regency or city i and time$t$.

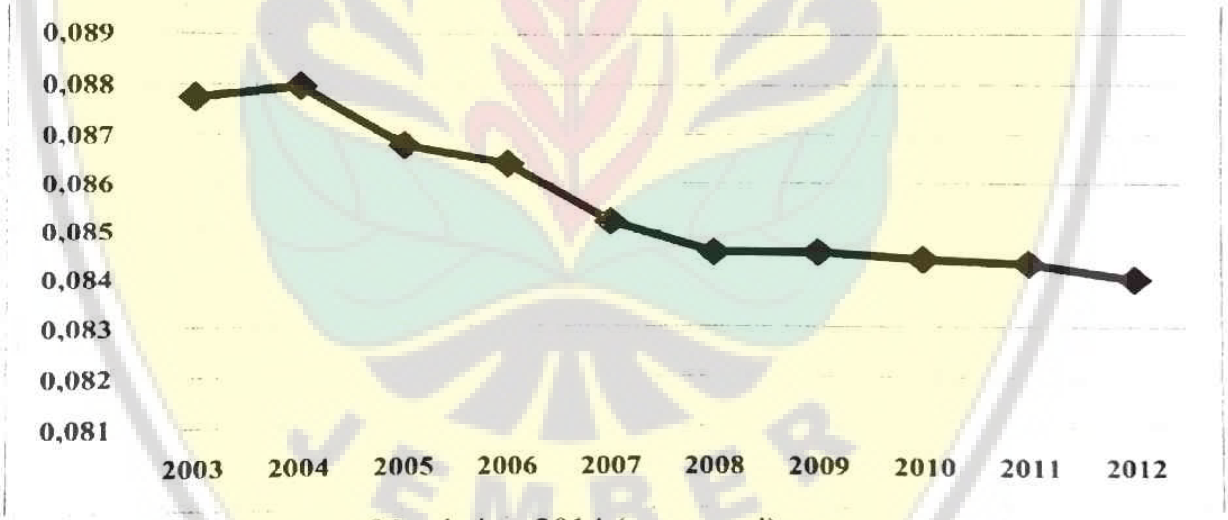
The analytical tool used to analyze the spatial aspect in this research is spatial econometric analysis. According to Bouayad-Agha and Védrine (2010), estimation method for spatial model of dynamic panel must deal with several major issues: (i) spatial dependence between observations for each spatial unit within a certain timeframe; (ii) spatial dependence at each point in time; and (iii) the unobservable effect in the period of time and space. In addition, further explained by Bouayad-Agha and Védrine (2010), the main argument for the use of development of GMM in spatial context is to overcome the endogeneity problem of spatially lagged dependent variable and the potential endogeneity of other explanatory variables. The alternative to be built is development using GMM as a method of analysis for the Dynamic Panel Data (DPD) process. Agha and Vedrine (2010) give the development of Arrelano-Bond (1991) and Blundell-Bond (1998), that is, GMM estimator by adding moment condition for spatially lagged variables. GMM approach has the advantage that can cope with the presence of several types of endogeneity on the right side of the correlation of the regressor with the error term (Mitze, 2012).

DISCUSSION

Sigma convergence in regencies and cities in East Java can be analyzed by using a dispersion of per capita income of regencies and cities in a certain period. Sigma convergence in East Java can be shown in the figure below. Sigma convergence analysis in this research used the value of the coefficient of variation.

The value of the coefficient of variation (CV) of log of per capita GRDP of regencies and cities in East Java in 2003 to 2012 in Figure 1 gives a description of whether sigma convergence occurred or not in the regencies and cities in East Java. This condition shows that in regencies and cities in East Java, inequality between regions from 2003 to 2012 decreased. In general, the dynamics of the regencies and cities in East Java indicates the success of the region in developing the potential of the region, so that the process of development is successful and disparities between regions in East Java have been lower.

Figure 1. Sigma Convergence of Regencies and Cities in East Java in 2004-2012



Source: Central Bureau of Statistics, 2014 (processed)

Based on the convergence model in the initial analysis, a model for absolute beta can be proved by performing a regression between the value of GRDP per capita and its initial condition. Results of the regression using several estimation methods are shown in Table 1.

Table 1. Results of Regression of Absolute Convergence

	Dependent Variabel: lnYit				
	Pooled OLS	Random Efect	Fixed Effect	Diff GMM	Sys GMM
Koefisien $\beta^{\sim}$	0.999	0.998*	0.937*	0.998*	1.001*
	(0.002)	(0.002)	(0.010)	(0.014)	(0.008)

Nilai β	-0.001	-0.001	-0.0063	-0.002	0.001
Konstanta	0.058*	0.063*	0.590*	-	0.0424
	(0.018)	(0.019)	(0.089)	-	(0.711)
Kec Konvergensi	0.01%	0.19%	6.10%	0.19%	-
Half Life	693.4	346.9	11.35	346.9	-
Hausman Test			36.42		
			0.0000		
Observasi	342	342	342	342	342
Adjusted R^2	0.9958	-	0.8993	-	-

Notes: Standard error in the parenthesis and significance level * P <0.05

Results of the absolute convergence regression shows that the whole methodsindicate significant value to the significance level of 5 percent. The different things are seen in the analysis using GMM system where the results of estimated coefficient of lagged GRDP per capita show a positive value which means that the condition in East Java tends to experience a divergence. Based on the best estimation model, that is, to control the bias estimation from other methods, then the value of GMM sytem becomes a reference in the analysis. Thus, the estimation results indicate that East Java in the period 2004 to 2012 had experienced an absolute divergence. Divergent conditionhas a little value where the value of the coefficient of convergence is only 0.001.

Prior to making an estimationof the spatial model, it is necessary to analyze in advance the presence or absence of spatial autocorrelation in the data. The analysis is used to obtain initial evidence of spatial autocorrelation in the data distribution of a variable within a certain time unit. Analysis tool used in this research is by looking at Morans I statistic. Table 2 presents Moran analysis output results for the overall variables to be studied and the time range of the research.

Table 2. Moran 'I Statistics

Variabel	Tahun								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Y	0.273	0.288	0.306	0.293	0.294	0.277	0.281	0.278	0.274
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RLS	0.502	0.504	0.494	0.480	0.481	0.481	0.490	0.493	0.485
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AHH	0.709	0.701	0.709	0.705	0.739	0.696	0.687	0.670	0.658
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Population	0.435	0.474	0.471	0.487	0.496	0.512	0.527	0.525	0.537
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DI	0.488	0.103	0.236	0.115	0.176	0.057	0.330	0.244	0.229
	(0.000)	(0.014)	(0.000)	(0.002)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)
FDI	0.193	0.186	0.044	0.078	0.236	0.306	0.077	0.189	0.133
	(0.000)	(0.000)	(0.156)	(0.001)	(0.000)	(0.000)	(0.071)	(0.001)	(0.017)
DF	0.534	0.491	0.749	0.773	0.752	0.716	0.648	0.689	0.759
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Description: The value in brackets is p-value

VARIABEL	DependenVariabelInYit						
	PLS	RE	FE	DIFF GMM		SYS GMM	

The value of Moran I statistic in the table indicates that in the data is indicated the existence of spatial autocorrelation. This indicates that the data contain in the early indication of the role of neighboring regions in influencing other areas.

The result of subsequent estimation is by taking into account the spatial aspects of the model of economic growth and convergence. The main thing in showing the spatial aspects in the econometric model inspatial econometrics is to raise the value of the variables in the neighboring areas. Value of W matrix is an important value in the spatial model, where the overflow variable is an interaction variable of spatial weighting of matrix W and the estimated value of the variable.

Table 3 Regression Results of Determiing Factors of Economic Growth and Convergence by Spatial Approach in East Java

Ln Yit-1	0.998***	0.996***	0.816***	0.872***	0.819***	1.017***	1.000**
	(0.003)	(0.004)	(0.017)	(0.038)	(0.027)	(0.012)	(0.004)
Nilai $\beta=\hat{\beta}$-1	-0.002	-0.004	-0.184	-0.128	-0.181	0.017	0
	-	-	-	-	-	-	-
1 Ln RLSit	0.023	0.029	0.152***	-0.026	0.110**	-0.004	0.026
	(0.016)	(0.018)	(0.039)	(0.067)	(0.054)	(0.039)	(0.019)
Ln AHHit	-0.046	-0.051	1.208***	1.958***	1.313***	-0.157	-0.091
	(0.046)	(0.052)	(0.214)	(0.573)	(0.339)	(0.103)	(0.065)
Ln PMAit	-0.001	-0.001	-0.001	-0.001	0.002	-0.003**	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Ln PMDNit	0.001	0.001	0.001	0.000	0.000	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln K.Pendit	-0.001	-0.001	-0.000	0.042	0.036	-0.002	-0.003
	(0.003)	(0.003)	(0.018)	(0.030)	(0.028)	(0.006)	(0.003)
D. Fiskalit	0.004	0.000	-0.055***	-0.024	-0.049	0.005	0.006
	(0.012)	(0.013)	(0.019)	(0.023)	(0.036)	(0.018)	(0.018)
W. Ln Y it	-0.014	-0.014	-0.015	-0.019	-0.025	-0.012	-0.022
	0.015)	(0.015)	(0.015)	(0.017)	(0.024)	(0.016)	(0.024)
W. Ln Y it-1	0.013	0.012	0.014	0.018	0.025	0.011	0.021
	(0.015)	(0.015)	(0.015)	(0.018)	(0.025)	(0.016)	(0.024)
W. Ln RLS	0.005	0.006	0.009	0.005	0.001	0.008	-0.001
	(0.007)	(0.007)	(0.006)	(0.008)	(0.010)	(0.007)	(0.009)
W. LnAHH	-0.002	-0.003	-0.004	-0.005	-0.000	-0.006	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
W. LnFDI	0.000	0.000	0.000	0.001	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
W. Ln DI	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
	0.002*	0.002*	0.001	0.003*	0.002	0.002*	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
W. Ln	0.000	0.001	-0.002	-0.001	-0.009	0.000	-0.001
	(0.005)	(0.005)	(0.005)	(0.006)	(0.008)	(0.006)	(0.007)
K.Pend W.	0.215	0.245	-3.753***	-	-	0.588	0.400
	(0.187)	(0.212)	(0.848)	-	-	(0.434)	(0.269)
D. Fiskal							
Observasi	342	342	342	342	342	342	342
Adj. R-Squared	0.9959	-	0.9103	-	-	-	-
LM Test	3.48		-	-	-	-	
Prob > Chibar2	0.031		-				
Hausman Test			54.93	-	-	-	-
Prob > Chi2			0.000	-	-	-	-
Sargan Test	-	-	-	98.3	317	117	411
P-value	-	-	-	0.093	1	0.141	0.999

Diff Sargan Test				-	-	23.17	136.9
P-value				-	-	0.335	0.020
AR(1)	-	-	-	-10.1	-10.3	-10.8	-10.5
P-value	-	-	-	0.000	0.000	0.00	0.000
AR(2)	-	-	-	-0.964	-1.814	-1.21	-1.06
P-value	-	-	-	0.335	0.416	0.226	0.291

Description: The standard error in parenthesis and significance level * p <0:10, ** P <0.05, *** p <0:01
The value β = β-1
Model 1: Variable log Yit-1, logRLSit, logAHHit is assumed endogenous while the other independent variables are assumed exogenous.
Model 2: All the independent variables are assumed endogenous

Based on Table 3, the estimation using PLS model, random effects and fixed effect of the dynamic model of economic growth tends to create an estimated value which is are biased and inconsistent. In addition, the problem of endogenity bias cannot be solved by the method, so to overcome the problem generalized method of moments (GMM) is used. The basic model in this research will be estimated using difference GMM model and GMM system. The estimation results using GMM in the basic model of human capital and economic growth are shown by difference GMM and GMM system.Sargan test value in the model shows the model of GMM system and difference GMM have p-value above the value of alpha, that is, 0.093 in model 1 of difference GMM , value 1 in model 2 of difference GMM, the value of 0.141 in model 1 of GMM system and value 0.999 in model 2 of GMM system. Model 2 of difference GMM, model 1 of GMM system and model 2 of system GMM have exact specifications. The indicators in other GMM system is difference Sargan test which means that the instruments used are not appropriate in the sense of the whole instrument or group of instruments (difference, level, GMM, IV), or, in other words, the assumption used in the modeling is not appropriate. GMM system model in model 1 has p-value of difference Sargan test above alpha which meansthat the set instrument used is of exogenous. Meanwhile, model 2 of GMM system is in opposition i.e. set instrument has an exogenous value.

GMM system model estimation results indicate that the lagged dependent variable (LnYit-1) has valueof 1,017 and is significant at 1 percent level. This indicates that the existence of conditional convergence in East Java did not happen. The estimated value of the divergence is relatively small and illustrates the wider gap in economic development in East Java. The main variable is the educated human capital (LnRLS) showing the value -0004 and is insignificant. Meanwhile, health (LnAHH) has a value of -0157 and is statistically not significant. The variable forming economic growth which has influence on the economic growth in Java is the value of foreign direct investment (LnPMA) with a value of -0003 and is significant

at the level of 10 percent. Whereas, the domestic investment (LnPMDN) has a value of 0.0001, population density (LnK.Pend) has a value of -0002 and control variable of fiscal decentralization (df) has a value of 0005 which is statistically not significant.

Spatial aspects of the economic growth model and kovergensi indicated by the overflow value from the neighboring variable value shows that overflow indicator is from neighboring regions. The results of the estimated overflow value showthe results in the effect of lagged dependent variable which indicates that W.lnYit value indicates a value of -0012 which is statistically not significant. The main focus of this model is the role of human capital in the neighboring areas indicated by the value of W.LnRLS and W.LnAHH, the coefficient of the value of human capital, respectively demonstrate the value of 0.008 and -0006 which are statistically insignificant. In general, educated people in the neighboring areas will have a positive effect on the economic growth, but these results are statistically insignificant. Control variable of the overflow effect indicates that the value of W.LnPMA, W.LnPMDN, and WDFiskal each has 0.0001, -0.0001, 0.0001 and is statistically insignificant. The overflow effect occurred in this model analysis only occurred from the overflow effects of population density (W.LnK.Pend) showing a value of 0.002 which is statistically significant at the 10 percent level.

CONCLUSION AND RECOMMENDATION

Analysis using spatial econometric model with GMM system provides empirical evidence that the spillovereffects of the factors forming the economic growth, especially in human capital to economic growth in East Java did not prove to happen. This explains that economic development in East Java is dominated by factors from the internal side of the region compared with the effects of interaction between the neigboring regions. The cluster pattern which is an initial indication of the analysis of the spillover effect is factually unable to be proven empirically to support the further process of the clusters of economic activities in East Java.

The existence of sigma convergence in East Java shows that in 2004 to 2012, the sigma convergence in regencies and cities in East Java occurred. In overall, sigma convergence in East Java in 2004 to 2012 proves that the dispersion of income per capita of the regencies and cities in East Java had been lower and lower. Absolute and conditional beta convergence in East Java in the period 2004 to 2012 did not prove to occur. Conditional beta convergence did not happen by controlling the spatial conditions since the neighboring effects in capital is specifically the existence of

spillover factors that occurr in spatial model proved to exist in the variable of population abundance.

The existence of spatial aspects in economic model, particularly the economic growth, proves the importance of the interconnection between regions in development policies such as infrastructure development, access to economic, social, education and health. The tendency of the concentration should be applied by the central and local governmentsto set it in an integrated policy. Dispersion of per capita income of any divergent conditions in absolute and conditional beta convergence should be a note for policy makers that this proves the wider inequality of income among regions in East Java. On the other hand, the convergence in a region proves how quickly the area can reach the same point. It requires the government's role as the central to the development, so it can develop the fundamental aspects of the economy, particularly those with long-term impacts, such as investments, on education and health.

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