

## **The Analysis of Absolute Convergency of Human Development Inter Provinces in Indonesia**

**Ana Syukriyah**✉

Economics Development Department, Economics Faculty, Universitas Negeri Semarang

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### **Abstract**

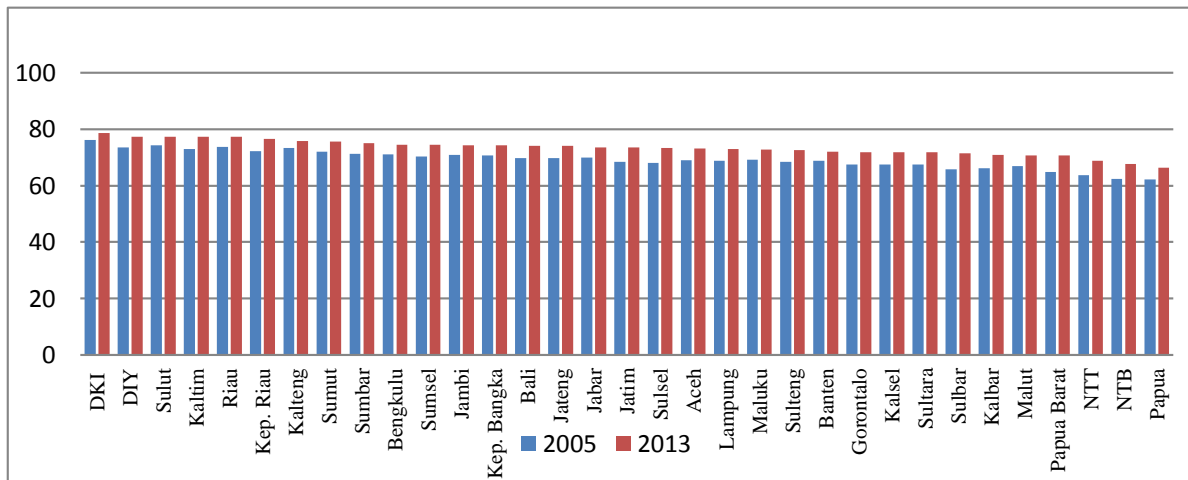
The purpose of this study was to identify the sigma and absolute beta convergence of the Human Development Index (HDI) inter provinces in Indonesia, and identify the speed of absolute beta convergence. This study used a quantitative analysis with tool used is regression panel data with fixed effect model Generalize Least Square method (GLS). The results shows that there happen sigma convergence of HDI and absolute beta convergence of HDI inter provinces in Indonesia. The speed of absolute convergence is equal to 0.807 percent annually.

## INTRODUCTION

The Human Development Index (HDI) is a composite indicator developed by UNDP in order to assess development success. HDI includes three basic dimensions of welfare: health, education and decent living standards. However, HDI does not describe human development as a whole, yet it is a better measurement than income. One of the most serious disadvantages of human development

index (HDI) is that it does not consider the distribution of human development within a country (Harttgen, 2012).

Indonesia is one of the developing countries with HDI of 57.2 in 2005 and increased to 68.4 in 2013 (UNDP, 2014). Indonesia's HDI is the accumulation of total HDI value of every province in Indonesia. The diversity of potential natural and human resources between regions makes the achievement of HDI in each province varies (Central Bureau of Statistics, 2013).



**Figure 1.** Development of Provincial HDI in Indonesia in 2005-2013

Source: Central Bureau of Statistics.

During the period of 2005-2013 the achievement of HDI value in each province in Indonesia experienced an increasing trend as shown in figure 1. The increase of HDI does not rule out the possibility of inter-provincial HDI gap in Indonesia. It can be seen on the highest achievement of HDI in 2005 that is DKI Jakarta with value equal to 76.07 and the lowest HDI that is Papua with HDI value equal to 62.08. Meanwhile, in 2013 the two provinces were still in the same position but with higher HDI value. In 2013, the value of Jakarta's HDI was 78.59 and the HDI value of Papua Province was 66.25.

In 2005, the difference between the highest and the lowest HDI was 13.99 points, while in 2013 the difference was at 12.34 points (Central Bureau of Statistics, 2013). It can be concluded that the disparity of human development at the provincial level is relatively decline. Therefore, the decline in that disparity indicates that the

value of inter-provincial HDI in Indonesia moves into one point.

Above all, low HDI achievement is not a barrier for human development improvement. Provinces with low HDI achievement have an opportunity to grow faster than provinces with high one. For example, regions in Papua tend to grow faster than those in DKI Jakarta which has high HDI (Central Bureau of Statistics, 2013). The process of self-chasing which is done by provinces that have low HDI is named as convergence.

According to Barro and Sala I (2004: 45), convergence is a phenomenon that leads to a single point. The convergence process is related to the development process of a region. In the context of economic growth, convergence occurs when poor areas with low incomes will grow faster than developed regions with high incomes, so by the time those regions will have the same

growth (convergent) (Mankiw 2004: 216). That explanation is based on the economy of a region will lead to steady state and if the economy has reached that condition then it will slowly run.

Furthermore, there are two convergence concepts, namely sigma convergence and beta convergence. Sigma convergence occurs when the dispersion as measured by the standard of cross-regional HDM logarithmic deviation tends to decrease. While beta convergence occurs when regions with low HDI tend to grow faster than areas with high HDI so low HDI areas tend to pursue high HDI areas.

In addition, beta convergence can be divided into two, namely absolute convergence and conditional convergence. Absolute beta convergence occurs when regions with low HDI grow faster than high HDI areas without any other influence from economy. While the conditional convergence measurement is done by adding control variables.

From the description above, this study aims to identify the sigma convergence and absolute beta of human development among provinces in Indonesia and identify the absolute beta convergence rate.

## RESEARCH METHOD

This study used secondary data that is data of HDI. The data is obtained from the publication of the Central Bureau of Statistics. The type of data used is panel data namely combination of time series and cross section. The time series data are from 2005 to 2013 while cross section data are 33 provinces in Indonesia.

Sigma convergence was measured by HDI dispersion logarithmic. While absolute beta convergence analysis was performed by panel data regression analysis. Besides, model selection was done to determine the best model between common, fixed and random effect in order to be used in panel data estimation. Model selection was done by using chow test and hausman test.

The absolute convergence model used in this study is a model developed by Barro and Sala I (1992), as follows:

$$\frac{1}{T} \log\left(\frac{y_{it+T}}{y_{i,t0}}\right) = \alpha - \left[\frac{1-e^{-\beta T}}{T}\right] \cdot \log(y_{i,t0}) + u_{iOT} \dots\dots\dots(1)$$

$i$  is the state or region,  $\alpha$  is the intercept,  $(y_{it+T}/y_{i,t0})$  is the growth rate of GDP per capita,  $y_{it+T}$  and  $y_{i,t0}$  is the per capita income at the end and the beginning of the period, while  $(1-e^{-\beta T})$  is the initial revenue coefficient that decreases with the length of the time interval. To obtain the HDI convergence regression model,  $Y_{it+T}$  variable is replaced by  $HDI_{it}$  variable, while  $Y_{i,t0}$  is replaced by using  $HDI_{i,t-1}$  variable. Further, the measurement of HDI convergence is done every year so  $T$  is equal to one then the absolute convergence model of HDI can be written as:

$$\text{Log}(IPM_{it}/IPM_{i,t-1}) = \alpha + \beta_1 \text{Log}IPM_{i,t-1} + e_{it} \dots\dots\dots(2)$$

$HDI_{it}$  is the provincial HDI  $i$  in year  $t$ ,  $HDI_{i,t-1}$  is the initial HDI and  $\text{Log}(HDI_{it}/HDI_{i,t-1})$  represents the annual growth rate of HDI. While  $e_{it}$  is an error term. Consequently, if the initial regression coefficient on HDI ( $\beta_1$ ) is negative, it means that if provinces with low HDI grow faster than provinces with the high one, absolute beta convergence (absolute  $\beta$  convergence) occurs.

According to Barro and Sala I (2004: 56), knowing the speed of convergence is important because if convergence occurs faster so economy will be getting closer to be steady state. The speed of convergence is calculated by finding  $\beta$  values first with the following formula:

$$\beta = -\frac{[\ln(1+\beta_1)]}{T} \dots\dots\dots(3)$$

$\beta$  is the convergence beta or average convergence rate,  $\beta_1$  is the initial HDI variable regression coefficient, and  $T$  is the number of time periods of analysis. If the value  $\beta_1 < 0$  then the parameter  $\beta$  will be positive and the higher  $\beta$  value indicates faster convergence (Wau, 2015: 110). After knowing absolute and conditional convergence, the speed of convergence is calculated by the following formula:

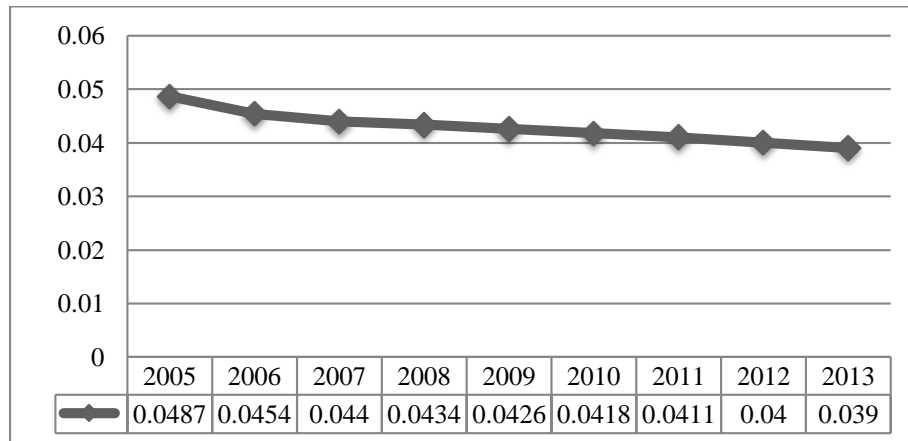
$$\text{Speed of convergence} = \beta \times 100\% \dots \dots \dots (4)$$

## RESULTS AND DISCUSSION

### Sigma convergence

The concept of sigma convergence

explains that human development between provinces in Indonesia is convergence if it decreases over time. In this study, the calculation of sigma convergence uses standard deviation of HDI logarithmic. The result of calculation of sigma convergence can be seen in figure 2.



Source: Processed data

**Figure 2.** Sigma Convergence

Figure 2 shows that at the beginning of the analysis year, the level of HDI gap between provinces in Indonesia is quite high. HDI dispersion trends were declining from 2005-2013. The value of HDI dispersion in 2005 was 0.048683 and decreased to 0.039037 in 2013. These results show that there is HDI sigma convergence among provinces in Indonesia.

This sigma convergence notes that the intergovernmental HDI gap narrows from 2005 to 2013, yet the decline value of HDI dispersion is quite small. Thus, the result of this sigma convergence indicates that reducing the gap rate could not quickly be done (Malik, 2014. In fact, the decline takes a very long time to get equity.

Moreover, changes or increases in HDI could not quickly happen. Human development is a process and could not be measured in a short time because the results of investment or development in education and health could not be felt in the short time. Yet, it takes a long time to take the benefit of investment or development in education and health.

Beta convergence explains that regions with low HDI are able to grow faster than the high ones. The calculation of beta convergence

which was conducted in this study is absolute beta convergence. This analysis was done by using panel data regression by referencing to the model proposed by Barro and Sala I (1992) as in equation 1. To get the absolute beta convergence model of HDI, the model is modified, so it becomes equation model 2. The method used for the estimation in this study is *Generalized Least Square* (GLS) method. It is to solve the problem of heterocedasticities among cross section units.

Furthermore, in estimating the absolute convergence is only use one independent variable that is the initial HDI log without entering other independent variables. The negative sign of the resulting regression coefficient will indicate the direction of convergence or divergence. The result of absolute convergence estimation can be seen in table 1.

Based on Table 1, it can be concluded that the initial HDI regression coefficient is -0.070076. The regression coefficient has a negative sign which means that there is a negative relationship between the growth of HDI and initial HDI. This indicates that there is convergence in inter-provincial HDI in Indonesia in 2005 – 2013. In

addition, provinces with low HDI are growing faster than high HDI provinces.

**Table 1.** Absolute Convergence Result by Fixed Effect of GLS Method Approach

Variab les	Coeffi cient	t- Statis tics	Probabi lities	Result
Const	0.3063	9.871	0.0000	Signifi
anta	46	805		cant
Initial	-	-	0.0000	Signifi
HDI	0.0700	9.616		cant
Log	76	759		
R-squared				0.4813
				49

Source: Processed data

As for provinces with low HDI will catch up so that the growth of HDI in all provinces is convergent or same. These results are supported by researches conducted by Konya and Guisan (2008), Hendrani (2012), Jorda and Sarabia

(2015) and Yang et al (2016). Those researches explain that there is absolute beta convergence of HDI. The value of determination coefficient of 0.481349 shows that 48.13 percent of HDI growth diversity in provincial units can be explained by the model, while the rest is explained by other variables outside the model. Besides, the constant value will be 0.306346 if the independent variable is remain constant, so the growth rate of the provincial HDI will be 0.306346.

The result of the fix effect model is assumed that there is a difference of intercept between cross section but the intercept is same time to time. It shows that every province analyzed in this study has uniqueness or heterogeneity that is the growth of basic HDI which is different between a province to another. The individual effects of each province are obtained from constant values plus the constants of each province. This difference can be seen from the intercept of each province as in table 2.

**Table 2.** Absolute Convergence Individual Effect

Province	Constanta	Coefficient	Province	Constanta	Coefficient
Riau Islands	0.00386	0.31021	West Papua	0.00024	0.30659
Riau	0.00365	0.31	South Sulawesi	0.0002	0.30655
East Borneo	0.00333	0.30968	Jambi	-0.0001	0.30623
DIY	0.00262	0.30897	Central Sulawesi	-0.0004	0.30599
East Java	0.00228	0.30863	West Java	-0.0005	0.30589
North Sulawesi	0.00225	0.3086	Aceh	-0.0012	0.30519
DKI	0.00207	0.30842	Lampung	-0.0012	0.30512
Central Borneo	0.00118	0.30752	West Borneo	-0.0016	0.30472
West Sumatra	0.00095	0.30729	North Sulawesi	-0.0016	0.30471
West Sulawesi	0.00092	0.30726	South Borneo	-0.0017	0.3046
North Sumatra	0.00087	0.30722	Maluku	-0.0023	0.30406
Central Java	0.00073	0.30707	West Nusa Tenggara	-0.0025	0.30388
Gorontalo	0.00069	0.30704	Banten	-0.0025	0.30382
South Sulawesi	0.00061	0.30696	East Nusa Tenggara	-0.0027	0.30366
Bangka Islands	0.00056	0.30691	North Maluku	-0.0036	0.30277
Bengkulu	0.00037	0.30671	Papua	-0.0058	0.30051
Bali	0.0003	0.30665			

Source: Processed data

Based on Table 2, it can be seen that the province that has the largest constant is Riau Islands 0.310208 which is the sum of the average constant of 0.306346 and the intercept of Riau Islands 0.003862. While the province that has the smallest constant is Papua that is equal to 0.300509. If other variables are considered zero, the growth of HDI Riau Islands is 0.310208 while Papua is equal to 0.300509.

The speed of convergence indicates how rapidly HDI resulted can establish HDI conditions. As the higher the speed of HDI convergence, so the established HDI conditions will be quickly reached. Furthermore, the absolute beta convergence rate of HDI is calculated based on  $\beta_1$  coefficient value as the result of the absolute convergence estimation.

Based on Table 1, it can be noted that the absolute convergence speed of the average HDI in 2005-2013 is 0.807 percent per year. These results indicate that the inter-provincial HDI gap in Indonesia will decline by 0.807 percent per year. Thus, the speed of absolute convergence is relatively slow so the time required to achieve a steady-state HDI becomes quite long.

## CONCLUSION

Regarding to results above, it can be concluded that there is convergence of sigma HDI and convergence of absolute beta of HDI between provinces in Indonesia in 2005-2013. The HDI sigma convergence shows that the inter-provincial HDI gap is decline while the absolute beta convergence of HDI shows that provinces with low HDI are growing faster than provinces high HDI. Forasmuch as provinces with low HDI will catch up so the growth of HDI in all provinces will be convergent or equal. Meanwhile, the speed of absolute convergence of inter-provincial HDI in Indonesia is 0.807 percent per year. That speed is relatively slow. As the result, the time required to achieve established HDI conditions will be quite long.

## REFERENCES

- Barro, R., dan Sala-i-Martin, X. (1992). *Convergence. Journal of Political Economy*, 100, 407–433.
- Barro, R., dan Sala-i-Martin, X.. 2004. *Economic Growth Second Edition*. London. England: The MIT Press Cambridge, Massachusetts.
- BPS. 2008. *Indeks Pembangunan Manusia 2006-2007*. Jakarta: Badan Pusat Statistik
- BPS. 2013. *Indeks Pembangunan Manusia 2012*. Jakarta: Badan Pusat Statistik.
- BPS. 2015. *Indeks Pembangunan Manusia 2014 Metode Baru*. Jakarta: Badan Pusat Statistik.
- Harttgen, Kenneth, Stephan Klasen. 2012. A Household-Based Human Development Index. *World Development*, 40(5), pp.878-899.
- Hendrani, Pilar.2012. *Konvergensi Indeks Pembangunan Manusia di Provinsi Banten*. Skripsi.Institut Pertanian Bogor.
- Jorda, Vanesa dan Jose Maria Sarabia. 2015. International Convergence in Well-Being Indicators. *Soc Indic Res*, (2015) 120:1–27.
- Konya, L., dan Guisan, M. C. 2008. What does the Human Development Index Tell Us About Convergence?, *Applied Econometrics and International Development*, 8, 19–40.
- Malik, Andrian Syah. 2014. *Analisis Konvergensi Antar Provinsi Di Indonesia Setelah Pelaksanaan Otonomi Daerah Tahun 2001-2012*. *Jejak* Vol 7, No 1 (2014): Maret 2014.
- Mankiw, N. Gregory.2004.*Teori Makroekonomi Edisi Kelima*. Terjemahan Imam Nurmawan. Jakarta: Erlangga.
- Ravallion, Marti. 2012. Troubling tradeoffs in the Human Development Index. *Journal of Development Economics*, 99(2), pp.201-209.
- UNDIP.2014. *Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. New York: PBM Graphics.
- Wau, Taosige.2015. *Konvergensi Pembangunan Ekonomi antar Daerah Kabupaten Dan Kota Di Sumatera Utara*. Proceedings SNEMA Padang.
- Yakunina, R.P., G.A. Bychkov. 2015. Correlation Analysis of the Components of the Human Development Index Across Countries. *Procedia Economics and Finance*, 24, pp.766-771.