Analysis of Regional Development Disparities in Situbondo Regency: Sigma Convergent Approach

Eny Supriyanti, Siswoyo Hari Santoso,I Wayan Subagiarta

Department of Economics and Development Studies, Faculty of Economic and Business, Universitas Jember

ABSTRACT: The issue of disparity between regions is still a priority in the handling of achieving sustainable economic growth. Disparity between regions can be explained through the convergent sigma approach. This study aims to look at the level of inequality in Situbondo using the convergent sigma approach. The Convergent Sigma approach measures disparity in regional development that occurs with the concept of Unweighted Coefficient of Variation, Williamson Index, and Theil Index. The results of this study indicate that behind the ongoing development there is still a disparity in development in Situbondo. However, the development level of disparity in Situbondo has decreased. One of the government's strategies undertaken to overcome disparities between regions is the improvement of public services, government assistance and optimization of regional revenue as an enhancer of regional operations.

KEY WORDS: Disparity; Sigma Convergent; Convergent.

I.INTRODUCTION

Economic growth as an indicator in seeing the success of a country's economic development (Todaro, 2006) is often offset by disparities between regions. Regional disparity has a large influence on economic activity (Anderi and Cracium, 2015; Idowu and Adeneye, 2017). Disparity between regions is an obstacle in creating sustainable economic development. Disparities that occur due to the concentration of regional economic activity, investment allocation, low levels of mobility of production factors between regions, differences in natural resources (SDA) between regions, differences in demographic conditions between regions and the lack of smooth trade between regions (Emilia and Imelia, 2006).

Economic growth without equality as opposed to disparity will widen the gap between one community group and another. Economic equality without economic growth is the same as increasing poverty in an area (Rubiarko, 2013). In a study conducted by Sivakumar and Vijay (2012) explained that disparity in India has an influence on poverty levels. While the research conducted by Gurgul and Lach (2011) provides an explanation that regional disparity has an impact on economic growth. In contrast to research conducted by Obradović*et al*. (2016) which explains that economic growth has an impact on increasing regional disparity. The difference in empirical results about the relationship between economic growth and regional disparity makes there still uncertainty.

Economic growth between different regions can cause inequality, and for this reason conditions are needed that explain the similarity of economic conditions between regions (Andreano *et al*, 2013; Dekiawan, 2014; Barro, 2016; Dana, 2018). Convergence is a concept to be able to see the similarity of conditions inter-regional economics. The presence of the concept of convergence can see when there will be economic equality between regions or countries. Thus, the convergence between regions will provide information when the level of disparity between regions is low (Schmitt and Peter, 2011; Dekiawan, 2014; Maryaningsih*et al*, 2014).

Cabral and Castellanos-Sosa (2019) in their research explained that when there was a global crisis the level of convergence between countries in Europe decreased. The same result was also shown by Blížkovský (2012) that in a European Union a convergence occurred which took a long time with the aim of reducing disparity. On the other hand, at the level of convergence in developing countries Agarwalla and Pangotra (2011) explain that convergence in the Indian state is accelerating when division of income groups.
Situbondo Regency as a research location is located in East Java Province, Indonesia. Behind the development that took place in the regency there was a disparity in development between regions that occurred between districts.

Different economic growth conditions between sub-districts in Situbondo accompanied by the development of income disparity indicate the need for studies related to disparity. Disparity research in Situbondo Regency will provide scientific identification related to policies that need to be carried out. On the other hand, this research is a reflection to reduce disparities that occur in other districts. Thus, this study aims to look at the level of convergence in Situbondo Regency, East Java Province, Indonesia through the convergent sigma approach.

II. LITERATURE SURVEY

The economic development of a region to realize economic growth is often accompanied by disparities between regions. Regional disparity can be identified by the presence of developed regions with underdeveloped or less developed regions because the growth is greater or smaller than population growth or changes in economic structure (Nurhada et al; 2011: 110). Emilia and Imelia (2006) and Chen (2010) explain the disparity between regions due to differences in regional characteristics such as differences in natural resources, differences in geographical conditions, centralized economic activity in an area (agglomeration), and lack of mobility of goods and services. . Shindo (2010) explains that disparities also occur due to differences in human capital. These differences can encourage different economic growth so as to lead to differences in economic growth.

The source of disparity problems between regions is often found but cannot be determined specifically such as differences in natural resources and geographical conditions. Syafrizal (2012) in his research on disparity explains that different economic growth is also one of the sources of disparity between regions, which is generally caused by the ability of an area to optimize its regional development. So that it will causedeveloped regionsandunderdeveloped regions. This research is also supported by Kuncoro (2006) and Sukirno (2010) who explain the differences in the level of uneven development in various regions causing gaps in regional development, causing uneven welfare which can be concluded as disparity in development between regions.

Convergence is defined as the economic condition of a poor country that can be equal or pursue an advanced economy (Andreano et al, 2013; Mankiw, 2013; Dekiawan, 2014; Barro, 2016; Dana, 2018). Convergent conditions can be interpreted as conditions during inter-regional meetings that have an impact on the low disparity (Schmitt and Peter, 2011; Dekiawan, 2014; Maryaningsihet al, 2014). Convergent Sigma is defined as an approach to directly see the distribution of income between regions (Dekiawan, 2014; Maryaningsih et al, 2014; Dana, 2018). The occurrence of real per capita income disparity between regions which has decreased every time indicates the existence of sigma convergence. The condition for convergence in the convergent sigma approach is seen from the Unweighted Coefficient of Variation, INonek Williamson, and Theil Index. The determination of the existence of convergence sigma can be calculated through the spread of economic growth measured as the coefficient of variation or standard deviation of the logarithm.

III. METHODOLOGY

Secondary data obtained from the Central Statistics Agency were used in this study. Secondary data used in the form of panel data with a time span between 2010 to 2017 in all districts included in the Situbondo Regency. The use of Convergent Sigma as an approach to see disparities based on economic growth in Situbondo Regency uses the Unweighted Coefficient of Variation, Williamson Index, andTheil Index.

Unweighted Coefficient of Variation is used to see an indication of disparity in the distribution of real per capita income in an area (Raksono & Tririsa NAV, 2018). The value of Unweighted Coefficient of Variation means that the lower the disparity in an area. The Unweighted Coefficient of Variation formulation can be written as follows:

$$Unweighted\ Coefficient\ of\ Variation = \frac{\sqrt{\frac{(Y_i - \bar{Y})^2}{n}}}{\bar{Y}} \qquad (1)$$

TheWilliamson Index is one of the analytical tools used to measure the level of development disparity between sub-districts in Situbondo Regency. In 1975, Williamson developed a regional gap index with the following formation (syafrizal, 2012):

$$Indek\ Williamson = \frac{\sqrt{\sum_{i=1}^{n}(y_i - y)^2(\frac{f_1}{n})}}{y} \qquad (2)$$

The Williamson Index value ranges from 0 to 1. If the Williamson Index value produces a value greater than or equal to 0, then it can be said that there is no gap between regions. Conversely, if the index has value, then there are economic gaps between regions. The greater the index produced, the greater the level of disparity between districts in a district.

Theil Index is used to see the contribution of disparity between districts in Situbondo. Districts with a value*Theil Index* positive explain the richest districts. While the *Theil Index* negative value indicates the poorest sub-district.

$$Theil\ Index = \frac{\sum Y_i \log(\frac{Y_i}{\bar{Y}})}{n\bar{Y}} \qquad\qquad (3)$$

Explanation

Y_i = GRDP per capita sub-district
i = district average GRDP per capita
n = number of sub-districts
f_i = Population subdistrict i
n = total population of the district

IV. RESULTS AND DISCUSSION

A. Analysis Unweighted Coefficient of Variation

The convergent sigma approach used in this study shows the level of disparity among the sub-districts in Situbondo. Analysis using Unweighted Coefficient of Variation is one of the indicators used in convergent sigma. According to this indicator the lower the Unweighted Coefficient of Variation shows that the disparity that occurs in an area is low. Analysis using this indicator shows disparities between districts in five of the seventeen subdistricts in Situbondo, which are described in Figure 1.
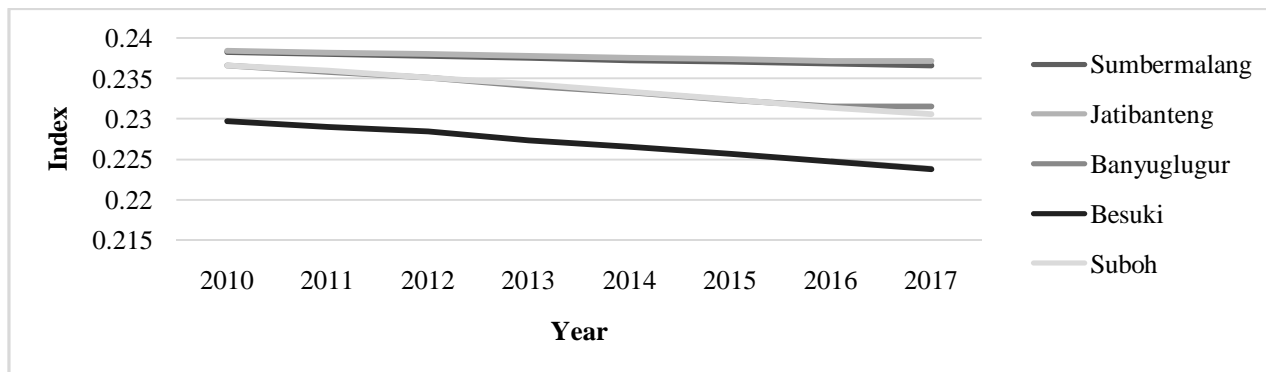

Fig. 1 *Coefficient of Variation* in Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Siboh Districts in 2010-2017

Based on Figure 1 above, there were disparities between regions in Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Suboh Districts in 2010-2017. This can be seen through the value of the indicatorUnweighted Coefficient of Variation which is still close to 0. The results of the analysis of the indicatorUnweighted Coefficient of Variation show that Banyuglugur District is a district that has a high inter-regional disparity compared to seventeen other districts. In 2010 the Banyuglugur and Sumbermalang Districts had the same index of 0.24 and decreased until 2017 where the Sumbermalang District had a lower index approaching 0.235 compared to Banyuglugur. Three other sub-districts namely Suboh and Jatibanteng sub-districts in 2010 had an index above 0.235 which decreased in 2017 Suboh sub-district had an index approaching 0.23 lower than Jatibanteng sub-district. The last subdistrict, Besuki, in 2010 had an index of 0.23, which continued to decline in 2017 by 0.225.
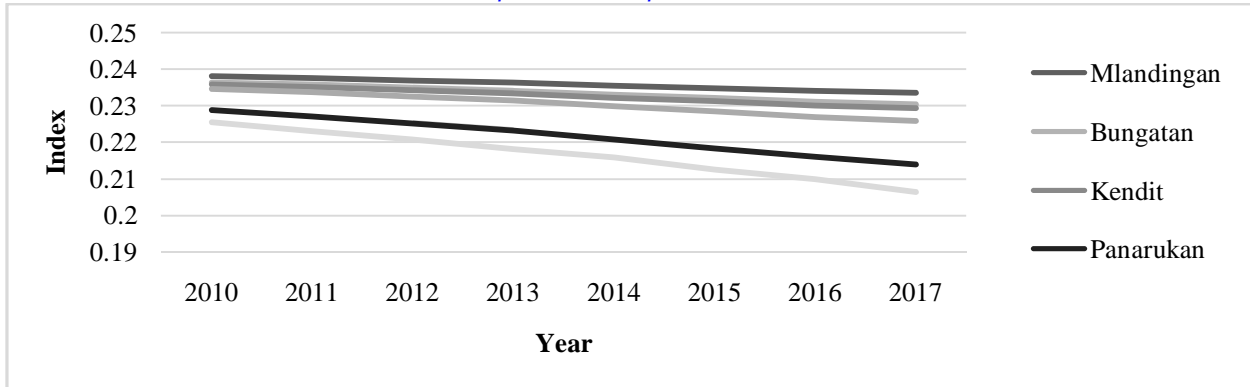
Fig. 2 Coefficient of Variation inMlandingan, Bungatan, Kendit, Panarukan, Situbondo City and Mangaran Districts in 2010-2017

The same results were also shown at the level of disparity in Mlandingan, Bungatan, Kendit, Panarukan, Kota Situbondo and Mangaran Districts in 2010-2017 based on the Unweighted Coefficient of Variation which is still experiencing disparity. This can be seen in the value of Unweighted Coefficient of Variation in the Districts of Mlandingan, Bungatan, Kendit, Panarukan, Situbondo city and Mangaran still far from 0 (zero). Mlandingan sub-district is a sub-district that has a higher level of disparity between regions compared to the other six sub-districts. However, the disparity development based on the Unweighted Coefficient of Variation of the seven sub-districts experienced a decrease in the level of disparity approaching 0 by 0.21 in 2017.
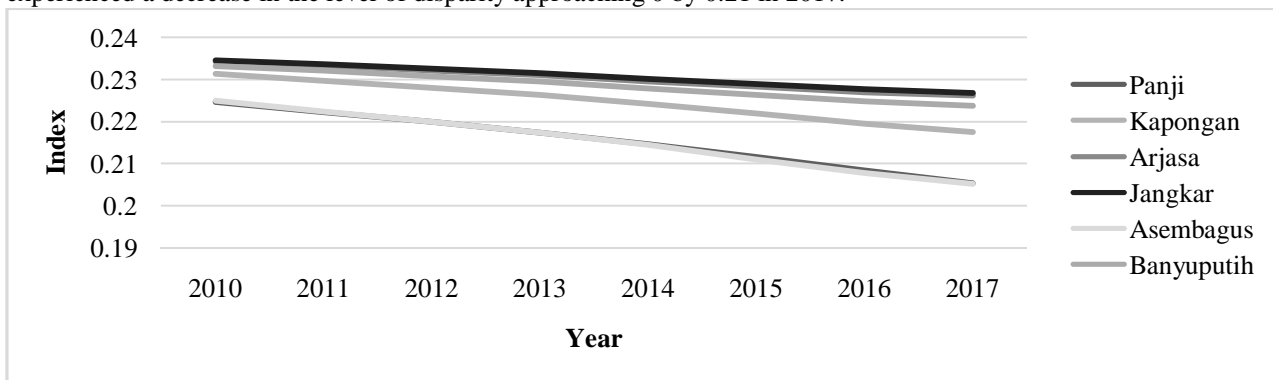

Fig. 3 Coefficient of Variation in Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputihin 2010-2017

Figure 3 explains the level of disparity in the Districts of Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputih based on the Unweighted Coefficient of Variation. Overall, the results of the Unweighted Coefficient of Variation indicate that disparities still occur in the Districts of Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputih. This can be seen from the value of the Unweighted Coefficient of Variation still far near 0 (zero). However, the development of Unweighted Coefficient of Variation shows a reduced disparity.

B. Analysis Williamson Index

Disparityinter-regional development districts in Situbondo also measured using analysis Williamson Index The value index Williamson ranges from 0 to 1. If the value of the Index Williamson produces a value of 0, it can be said that there is no gap between regions. Conversely, if the index has a value of 0 then there is an economic gap between regions. The greater the index produced, the greater the level of disparity between districts in a district.
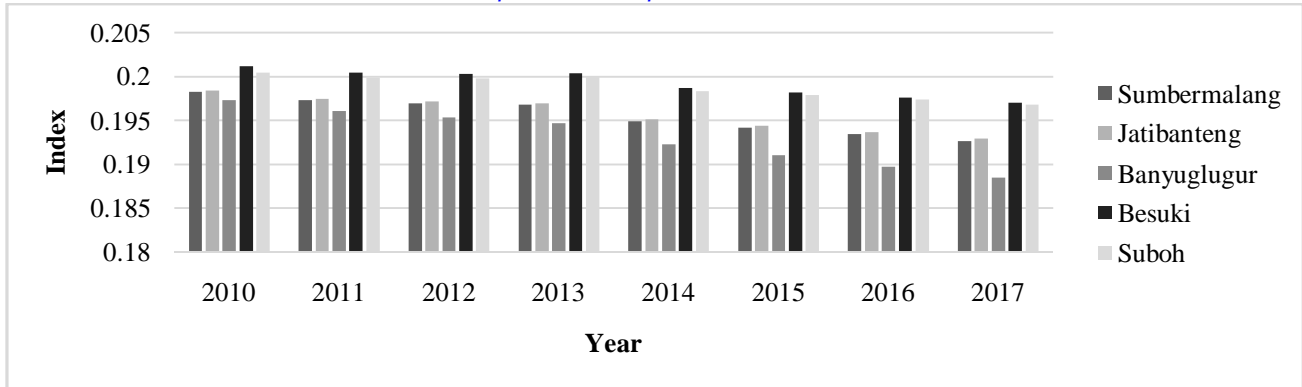
Fig. 4Williamson Index in Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Subohin 2010-2017

Figure 4 explains the Index Williamson in Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Suboh Districts in 2010-2017 which as a whole shows the disparity in development between regions in the six sub-districts. This can be seen from thevalue of the Williamson Index six districts which is still far from 0 (zero). In 2010 the Besuki District has a Williamson index value that is higher when compared to the other five districts, which is close to 0.202. However, as the year progressed, the value of the Williamson index in the Besuki sub-district declined until 2017, which was close to 0.198. However, the Williamson index in the Besuki sub-district was still higher than the five other sub-districts. On the other hand, Banyuglugur District is the sub-district that has the lowest Williamson index compared to the other five districts, which is approaching 0.198. The Williamson index value in the Banyuglugur sub-district continued to decline until 2017 and became the sub-district with the lowest Williamson index value of 0.188. Overall, the development of disparity levels in the Districts of Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Suboh in 2010-2017 decreased.
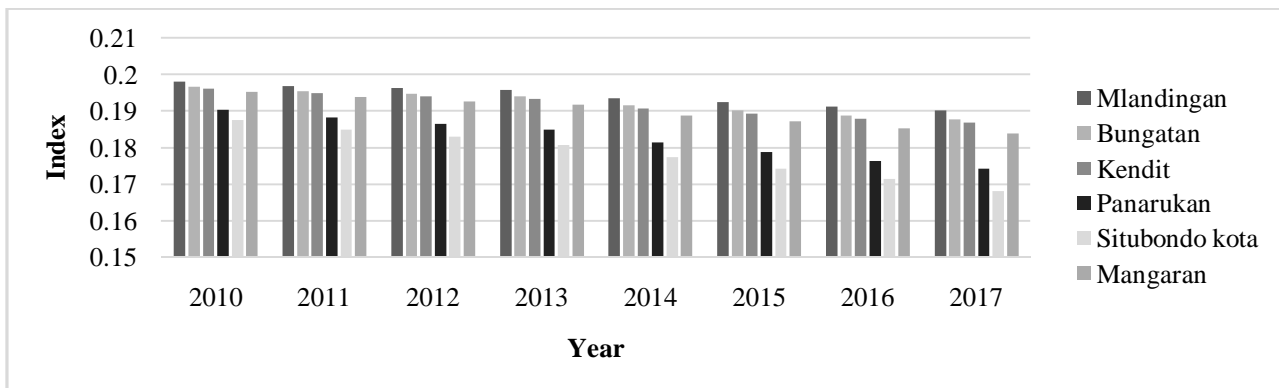

Fig. 5Williamson Index in Mlandingan, Bungatan, Kendit, Panarukan, Situbondo City and Mangatanin 2010-2017

DistrictsIn Mlandingan, Bungatan, Kendit, Panarukan, Kota Situbondo and Mangaran Districts, disparities still occur. This can be seen from thevalue Index Williamsonin Figure 5 which is far closer to 0 (zero). This condition provides an explanation that the level of disparity in the Districts of Mlandingan, Bungatan, Kendit, Panarukan, Situbondo city and Mangaran still occur. However, the development level of disparity has decreased.

Based on Figure 6 which explains the level of disparity in the Districts of Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputih using the method Williamson Index shows that there are still disparities. This can be seen from the value Index Williamson which is still far from 0 (zero). However, the development of the level of disparity in the Districts of Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputih using themethod Index Williamson has decreased.
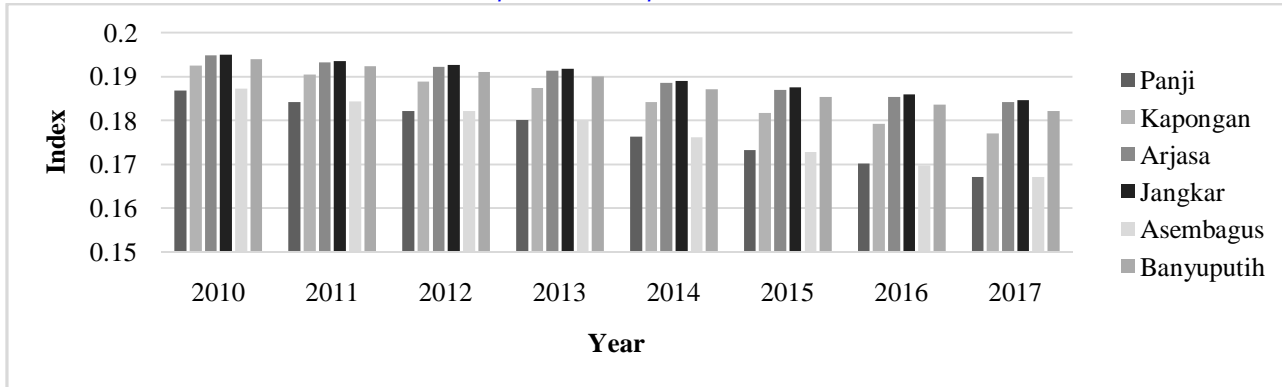
Fig. 6Williamson Index in Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputihin 2010-2017

C. Analysis Theil Index

Analysis of regional development disparity in Situbondo also uses *Theil Index. Theil Index is* used to see the contribution of disparity between provinces, which in this case is used to see the contribution of disparity between districts in Situbondo District. Districts with a value*Theil Index* positive explain the richest districts and vice versa values*Theil Index* negatively indicate the poorest districts. Overall the test*Theil Index* conducted in seventeen districts in Situbondo District shows that overall the condition of the seventeen districts is poor.
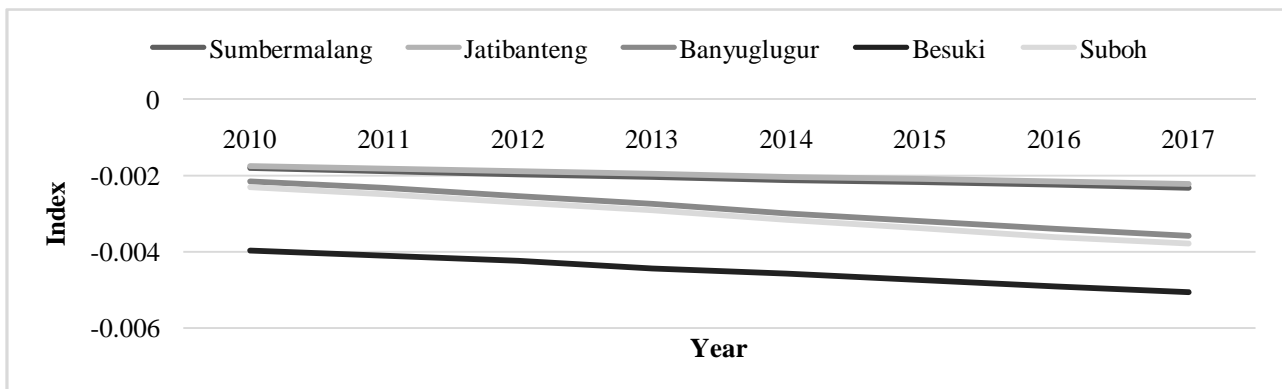

Fig. 7Theil Index in Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Subohin 2010-2017

Based on Figure 7 which explains the level of disparity in the Districts of Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Suboh in 2010-2017 using the method Theil index. Calculation results Theil Index show that the Districts of Sumbermalang, Jatibanteng, Banyuglugur, Besuki and Suboh are still classified as poor districts with disparities. Theil Index scores for the five sub-districts are still negative, which continues to increase disparity until 2017.

On the other hand, the level of disparity that occurred in Mlandingan, Bungatan, Kendit, Panarukan, Situbondo and Mangaran Districts in 2010-2017 with the method Theil Index showed that there were still disparities. This can be seen from the value of Theil Index which is negative. Similar to the five previous sub-districts in Figure 8, the six sub-districts covering Mlandingan, Bungatan, Kendit, Panarukan, city Situbondo and Mangaran Districts show the value of Theil Index which continues to increase to near -0.008 in 2017 so that we can conclude that the six sub-districts the disparity has increased and has become a poor district.
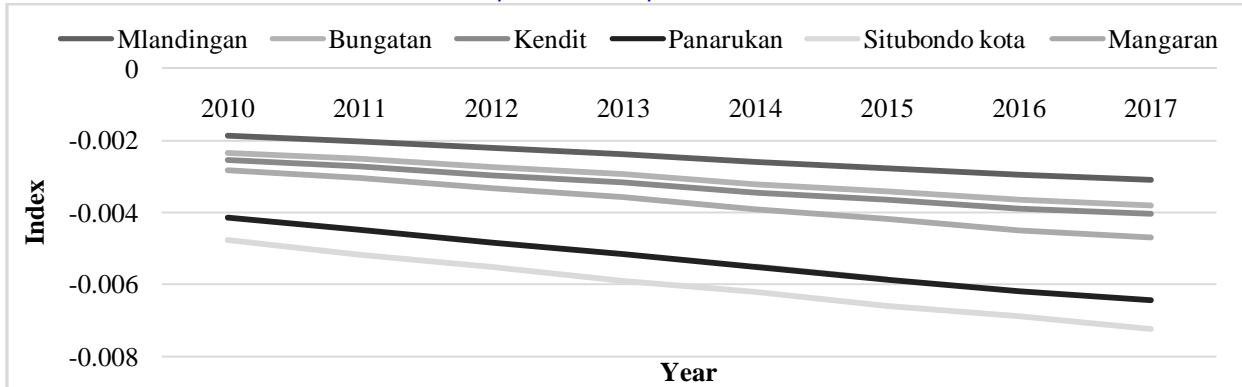
Fig. 8Theil Index in Mlandingan, Bungatan, Kendit, Panarukan, Situbondo City and Mangatanin 2010-2017

Similar to the previous six sub-districts, Panji, Kapongan, Arjasa, Jangkar, Asembagus and Banyuputih Districts in 2010-2017 disparities occurred. This can be seen from the value of Theil Index in Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputih Districts which are negative. Until 2017, the six sub-districts continue to experience an increase in index values to near -0.008, which indicates that development disparities continue to occur and are increasing so that the six sub-districts increase in status and become poorer.
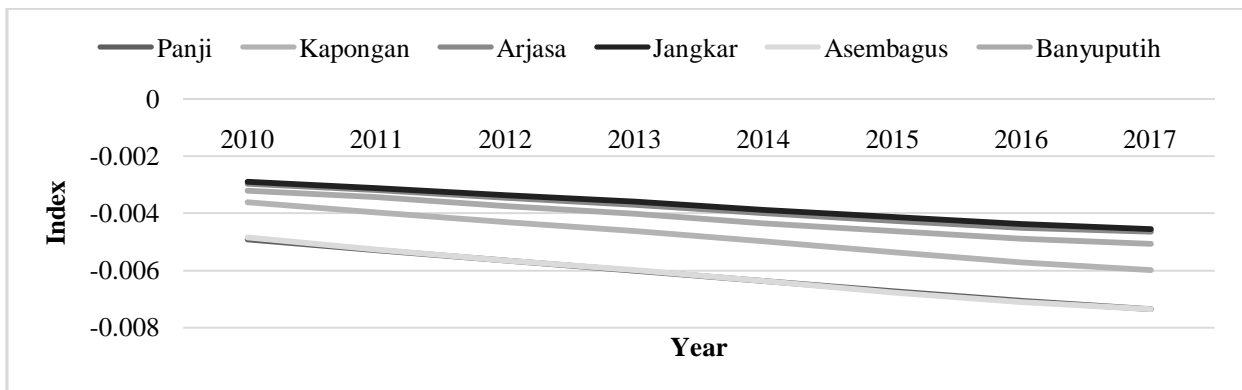

Fig. 9Williamson Index in Panji, Kapongan, Arjasa, Anchor, Asembagus and Banyuputihin 2010-2017

On the other hand, if based on the results of the analysis using the convergent sigma approach it can be seen that the sub-district ranking with the highest and lowest inequality. Based on the results of the convergent sigma analysis accompanied by taking in 2017 it will be known in detail the sub-district ranking. Thus, it can be used as a reference for sub-districts that need to be developed to promote equality.

The results of the analysis using three tests namely Unweighted Coefficient of Variation, the Index Williamson, and Theil Index in Situbondo District showed that there were still disparities. There are four districts that have the highest level of disparity, namely Jatibanteng, Sumbermalang, Mlandingan, Banyuglugur, and Suboh. Meanwhile, the districts with the lowest disparity rates were Kapongan, Panarukan, Situbondo Kota, Panji and Asembagus Districts. Although overall the disparity conditions experienced a significantly moving graph that is experiencing a decrease and increase. This condition is an opportunity for Situbondo Regency to reduce disparities that occur with progressive policies given the condition of the seventeen subdistricts that are sheltered. Policies that need to be undertaken by the government in order to reduce disparity must focus on districts that have the highest level of disparity based on convergent sigma.

Table 1. Disparity Ranking Based on Sigma Convergence

William Index		Unweighted CV		Theil Index	
District	Value	District	Value	District	Value
Besuki	0.197062244	Jatibanteng	0.237202	Jatibanteng	-0.00221
Suboh	0.196832712	Sumbermalang	0.236592	Sumbermalang	-0.00232
Jatibanteng	0.192926895	Mlandingan	0.233657	Mlandingan	-0.00309
Sumbermalang	0.19262479	Banyuglugur	0.231526	Banyuglugur	-0.00359
Mlandingan	0.190235476	Suboh	0.230601	Suboh	-0.00379
Banyuglugur	0.188499931	Bungatan	0.23048	Bungatan	-0.00381
Bungatan	0.1876484	Kendit	0.229413	Kendit	-0.00403
Kendit	0.186779906	Anchor	0.226755	Anchor	-0.00454
Anchor	0.184615813	Arjasa	0.22621	Arjasa	-0.00464
Arjasa	0.184171932	Mangaran	0.225883	Mangaran	-0.0047
Mangaran	0.183905778	Besuki	0.223782	Besuki	-0.00506
Banyuputih	0.182156245	Banyuputih	0.223734	Banyuputih	-0.00506
Kapongan	0.177042853	Kapongan	0.217453	Kapongan	-0.00599
Panarukan	0.174168973	Panarukan	0.213924	Panarukan	-0.00644
Situbondo city	0.168140857	Situbondo city	0.20652	Situbondo city	-0.00724
Panji	0.167169796	Panji	0.205327	Panji	-0.00735
Asembagus	0.167052652	Asembagus	0.205183	Asembagus	-0.00736

Table 2. is an even distribution of development strategies based on the RPJPN 2005-2025. One of the objectives of the 2005-2025 RPJPN is to reduce social inequality which is more focused on weak or disadvantaged areas. Policies directed as a strategy of equitable development based on the 2005-2025 National Medium-Term Development Plan aim at poverty reduction, equality and empowerment needed to overcome disparities that occur in Situbondo Regency. The policy carried out will reduce disparity that focuses on areas that are left behind so as to create conditions of convergence.

Table 2 Development Strategy Based RPJPN 2005-2025 Equity

Interest	Policy Direction
· Reducing social inequalities are more focused on the weak or disadvantaged regions · Tackling poverty and unemployment · Provide access to social services and infrastructure	· Poverty directed to protection and equality · Development social protection and security systems · Increasing the role of cooperatives and empowering micro and small businesses · Increasing employment opportunities for the poor

In line with the 2005-2025 RPJPN which is a global map of the central government for equitable national development, the policy that needs to be done by the Situbondo Regency government to reduce disparities that occur can be in the form of improving the quality and availability of public services that are able to reach all community groups. Other policies that can be carried out are reducing the burden of spending on the poor by channelling aid in the form of rice subsidies, subsidies on education funds, energy distribution, to direct assistance which is now in the form of non-cash. The final policy that can be undertaken by the government is the distribution of district revenue sources also needs to be carried out evenly by utilizing tax revenue on matters that have a direct impact on society.

V.CONCLUSION

Situbondo Regency is in a condition that requires special attention to deal with disparities that still occur in regional development in the seventeen districts. This is supported by tests conducted with the convergent sigma approach. Overall development disparity between regions in Situbondo has decreased and increased from 2010 to 2017 which requires responsive action from the government. The government responsive action can be in the form of equity in the seventeen sub-districts which covers the improvement of the quality and availability of public services; targeted government assistance as well as increased regional revenue income.

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