International Journal of Development and Economic Sustainability
Vol.5, No.6, pp.21-30, November 2017
Published by European Centre for Research Training and Development UK (www.eajournals.org)

STRUCTURAL CHANGE IN REGIONAL ECONOMIES: EMPIRICAL EVIDENCE FROM ACEH, INDONESIA

Khairul Aswadi[1*], Ratna Mutia[1], Amiruddin[3], Ishak Hasan[2], Martahadi[3]

[1]Department of Economic Education, Universitas Serambi Mekkah, Indonesia
[2]Department of Economic Education, Universitas Syiah Kuala, Indonesia
[3]Department of Economic Development, Universitas Samudra, Indonesia

ABSTRACT: *Aceh is a western province of Indonesia, located on the Sumatera Island. This study aims to describe economic conditions in the Aceh Province. The economic phenomenon is described using the Esteban-Marquilas modified shift-share analysis. The results show that most of the economic sectors in Aceh Province do not have a competitive advantage but still specialize compared to the same sector at the national level. Nevertheless, there are still two sectors that have a competitive advantage and specialize, namely the water supply, sewerage, waste management and remediation activities sectors; and accommodation and food service activities sector. This is due to the decrease in the contribution of primary and secondary sectors in the formation of gross regional domestic product in Aceh. Earlier Aceh's economy depended on the primary sector. This indicates a structural change in the economy*.

KEYWORDS: Regional Development, Structural Change, Competitive Advantage, Shift-Share Analysis, Allocation Effect

INTRODUCTION

The economic structure describes a composition of the economic sectors in the region's economy in a country. The contribution of these economic sectors to an economy may vary over time. This can change the contribution of each economic sector to positive or negative, decrease or increase to the national economy. High economic growth in a region is needed to accelerate the process of transforming the regional economic structure to an ever-increasing and dynamic economy with strong and advanced industries, more resilient agriculture and an inter-sectoral potential for sustainable economic growth. Economic development in the long-term, with growing national income growth, will bring about a fundamental change in the economic structure, from traditional economies to agriculture as a primary sector to a modern economy dominated by non-primary sectors, especially manufacturing industries as the main engines which will drive economic growth (Tambunan, 2014: 57). According to Chenery (1992) in Tambunan (2014), the process of transformation of economic structure will reach its fastest level if the shift in domestic demand patterns toward the output of the manufacturing industry is reinforced by similar changes in foreign trade composition as happened in NICs groups such as Korea South, Taiwan, Singapore, and Hongkong.

In OECD countries, structural transformation in the labor market has a significant impact on the labor market because increased labor productivity has a negative impact on employment in the economy, where increased productivity and labor specialization affect long-term unemployment rates (Mecik et al., 2014). The transformation of the economic structure will only work well if it is followed by equalization of learning opportunities, the decrease in the

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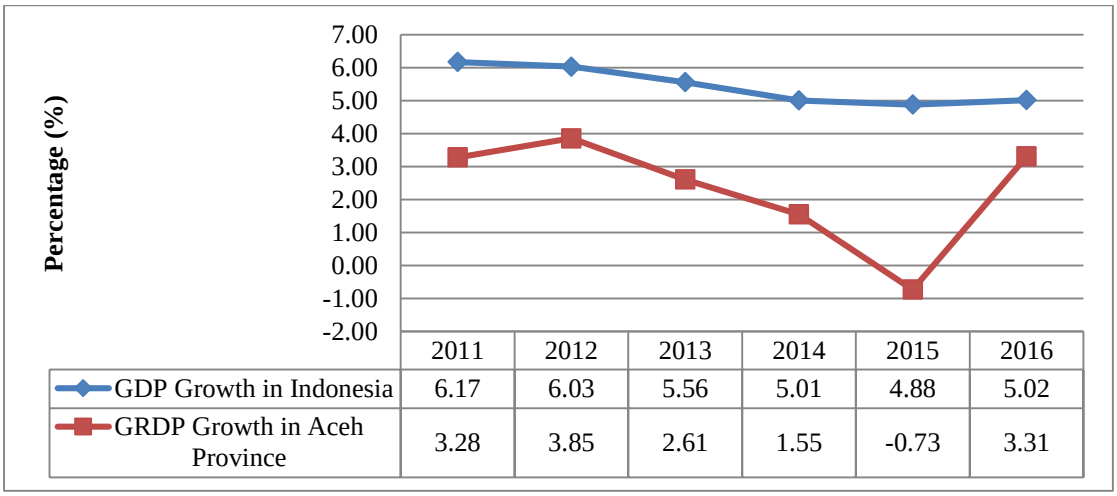
rate of population growth, and the decrease of the degree of economic dualism between cities and villages. If this is met then the process of transformation of an economic structure will be followed by increased income and equal distribution of income that will occur simultaneously (Kuncoro, 2006: 65).

To measure the transformation of economic structure in this study using the shift-share analysis approach. Shift-share analysis is one of the analytical techniques in regional economics that aims to determine the main factors that affect the economic growth of a region (Syafrizal, 2009: 179). This shift-share analysis method starts from the basic assumption that the economic growth of a region is influenced by three main components that are interconnected with one another, namely economic growth, sectoral growth and the growth of inter-regional competitiveness (Tambunan, 2001: 291).

The economic structure of Aceh until 2016 is still dominated by agriculture, forestry and fishery sector with the contribution of 29.41 percent. The contribution of the agriculture, forestry and fishery sector in Aceh tends to increase, compared to the year 2012 which contributes only 25.88 percent. The sectors with the second largest contribution are wholesale and retail trades, repair of motor vehicles and motorcycles sector with the contribution of 16.33 percent. It seems like the agricultural sector, this sector continues to increase from the year 2012 which only amounted to 14.31 percent. The construction sector ranks third with a contribution of 10.27 percent by 2016, also up from 8.40 percent in 2012. Furthermore, the mining and quarrying sector which in 2012 ranks third with a contribution of 13.41 percent, in 2016 its contribution fell to 4.48 percent. The decrease in oil and gas production and the decrease of world oil prices drastically since mid-2014 plays a major role in this decrease (Statistic of Aceh Province, 2017). This has triggered a low rate of economic growth (Figure 1).



	2011	2012	2013	2014	2015	2016
GDP Growth in Indonesia	6.17	6.03	5.56	5.01	4.88	5.02
GRDP Growth in Aceh Province	3.28	3.85	2.61	1.55	-0.73	3.31

Sumber: Statistics Indonesia, 2017.

Figure 1. Economic Growth in Aceh Province, Indonesia: 2011-2016

Based on the picture above shows that the economic growth rate in Aceh Province is lower than the national economic growth rate. The rate of economic growth in Aceh from 2011 to 2016 tended to fluctuate and be in the range of 5 percent, ie 3.28 percent in 2011, 3.85 percent

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in 2012, further down to 2.61 percent in 2013. In 2014 the pace its growth has decreased by 1.55 percent and decreased drastically until -0.73 percent in 2015. Then in 2016 again increased with a growth rate of 3.31 percent. The low economic growth in Aceh is due to the decreased contribution of the mining and quarrying sectors, and the manufacturing sector.

During the period of 2010 to 2016, it appears that primary and secondary sectors continue to decrease their contribution to the formation of GRDP in Aceh, while the tertiary sector continues to increase its contribution, it clearly illustrates the transformation of economic structure. Is the decrease in the contribution of the primary sector to a structural change?

LITERATURE REVIEW

Changes in economic structure is a change in the structure of the economy from the primary sector to the secondary and tertiary sectors (Martahadi, 2014). Akita et al. (2011), examines the structural changes and inequality of regional income distribution in Indonesia, revealing that the contribution of the mining sector has decreased, but in Sumatra and Kalimantan spatially the manufacturing industry plays a more important role in creating the gap. While in Jakarta more influenced by the power of urbanization, the impact of globalization and trade liberalization, as well as the financial sector. This leads to inequality and gaps in Indonesia (Akita et al., 2011).

The same is also stated by Agustiar (2013) who has examined the structural transformation in West Kalimantan to the ASEAN Economic Community (AEC) 2015, by calculating the level of productivity and assessing the impact of the agricultural downturn on non-agricultural sector performance in West Kalimantan over the last 40 years, that economic transformation has occurred with low agricultural productivity, followed by a decrease in agricultural productivity followed by increased output of the trade and manufacturing sectors. The analysis of industrial structural transformation, especially in the manufacturing sector, should take precedence when analyzing the structural transformation of an economy (Li and Lin, 2017); and the more open countries will develop faster, but in general in developing countries less can increase their economic growth (Chamon and Kremer, 2009)

One of the instruments that can be used to analyze regional economic structure changes is Shift-share analysis. Shift-share analysis has been used by regional economists to describe inter-regional growth compared to its reference or national territory. the shift-share analysis can reveal factors that cause regional growth differentials (Esteban-marquilas, 1972), and have effectively proven it as an instrument that can reflect changes in regional development (Shi and Yang, 2008). Where the relationship between regional economic growth and industrial structure is often analyzed with several components, namely national growth, industry mix, competitive advantage, and allocation effects (Esteban-marquilas, 1972, Herzog and Olsen, 1977, Jackson and Haynes, 1979; Shi and Yang, 2008; Nee, 2012). Shift-share analysis as a simple approach to separate the contribution of national industry growth and regional industry growth has been used since 1960 for regional economic analysis and planning using employment and Gross Domestic Product (GDP) data to provide an overview of the regional economy (Nee, 2012).

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Through decomposition techniques in shift-share analysis, the analysis of regional economic growth is broken down into several components to distinguish the overall nature of the change (Jackson and Haynes, 1979), in which the expected regional change mix is expected if its economic sector grows at the same rate as the sector economy at the national level. Similarly, regional changes are expected if the industry sector changes at the same level as the same industry sector at the national level, and changes in regional shifts can be explained specifically for a region (Jackson and Haynes, 1979). Decomposition techniques are used in regional studies to measure the effects of industry mix and competitive effects on the relative growth of regional employment or other variables relevant to national growth averages (Knudsen, 2000; Artige and van Neuss, 2014).

In classic shift-share analysis does not include an element of allocation effect in its analysis. Esteban-Marquillas (1972) has re-modified the equations of classical divisions to solve the problem of allocation effects. This is done by redefining competitive positions and creating the fourth shift-share component, the effect of the allocation (Herzog and Olsen, 1977). However, Shift-share analysis still has limitations associated with high aggregate data, the measurement of mixed industry effects and competitive effects vary with the level of aggregation in the data, using very simple disaggregation of the regional economic composition for exposition purposes through dynamic engineering versions can use data of any disaggregation level (Barff and Knight, 1988).

RESEARCH METHODS

Research focuses on regional economic development. The main focus of this research is on the change of regional economic structure in Ponvinsi Aceh, Indonesia. Using GDP data is expected to illustrate in detail the position of economic changes during the period 2010-2016, which is compared with the national economy as reference regions.

This research data uses secondary data sourced from Statistics of Aceh Province and Statistics Indonesia. To observe changes in Aceh's economic structure during the observation period, use GRDP of Aceh and GDP data as the reference region. Furthermore, the data are analyzed by using Shift-Share analysis of modified Estaban-Marquillas (Ahmad, 2001, in Martahadi, 2014), namely:

$$D_{ij} = Q_{ij}\, r_n + Q_{ij}\,(r_{ij} - r_{in}) + hQ_{ij}\,.\,(r_{ij} - r_{in}) + (Q_{ij} - hQ_{ij})\,.\,(r_{ij} - r_{in})$$

$$D_{ij} = G_{ij} + M_{ij} + hC_{ij} + A_{ij}$$

Where D_{ij} is the GRDP change in sector i in the observation region, Q_{ij} is the GRDP of sector i in the base year of analysis in the observation region, hQ_{ij} is GRDP in sector i in the final year of analysis in the observation region, and rij is the rate of growth in sector i in the region observation. Furthermore, rin is the rate of growth in sector i at the national level, rn is the rate of national economic growth, Gij is the effect of national economic growth, M_{ij} is a proportional shift, hC_{ij} is a competitive advantage or uncertainty in sector i in the observation region when the homothetic component of Q grow location quotient equals one, and A_{ij} is the effect of allocation for sector i in the observation region. To explain the effect of an allocation (A_{ij}) on the economy in Aceh Province, the following table of possible positional allocation

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criteria (Olsen and Herzog, 1977) is presented.

Table 1. Possible Position of Allocation Effect

Code	Definition	Allocation Effect (A_{ij})	Component	
			Specialization (Q_{ij}-hQ_{ij})	Competitive Advantage (r_{ij} - r_{in})
1	Competitive disadvantage and specialized	-	+	-
2	Competitive disadvantage and not specialized	+	-	-
3	Competitive advantage and not specialized	-	-	+
4	Competitive advantage and specialized	+	+	+

Source: Olsen dan Herzog, (1977), Shift-Share Analysis Revisited: The Allocation Effect and the Stability Of Regional Structure', *Journal of Regional Science*, 17(3), pp. 441–454

RESULT

Regional economic development in Aceh Province from year to year decreased. The main cause of the low rate of economic growth in Aceh is the decrease in the contribution of industrial sectors derived from the exploitation of natural resources caused by the cessation of oil and gas exploration operations in 2014. Distribution of each sector to GRDP can be observed in Table 2.

Industrial origin in Aceh is grouped into three main sectors, namely primary, secondary and tertiary sectors. Based on Table 2, among the three sectors, the tertiary sector contributed the highest, with the contribution of the tertiary sector in the initial year of observation of 42.40 percent, and increasing until the final year of observation, which was 50.32 percent. Further followed by primary sector, where the contribution of the primary sector in the early years of observation is 40,54 percent, and decreasing until the end of year observation, that is equal to 33,89 percent. The decrease in the contribution to the tertiary sector is due to decreased performance in the mining and quarrying sectors due to decreased oil and gas production. Similarly, the secondary sector continues to decrease, wherein the initial year of observation the contribution of this sector reached 17.06 percent but continued to decrease until the final year of observation, which became 15.79 percent. This is triggered by continued decreased production in the manufacturing sector.

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Table 2. Percentage Distribution GRDP at Current Prices by Industrial Origin of Aceh, Indonesia: 2010-2016

Industrial Origin	2010	2011	2012	2013	2014	2015	2016
Primary Sector	**40,54**	**40,17**	**39,29**	**38,74**	**37,52**	**34,84**	**33,89**
1. Agriculture, Forestry, and Fishery	25,19	25,46	25,88	26,58	26,85	29,15	29,41
2. Mining and Quarrying	15,34	14,70	13,41	12,15	10,66	5,69	4,48
Secondary Sector	**17,06**	**17,02**	**17,14**	**16,74**	**16,47**	**15,69**	**15,79**
3. Manufacturing	8,85	8,65	8,61	8,04	7,40	5,98	5,36
4. Electricity and Gas Supply	0,11	0,11	0,10	0,10	0,10	0,11	0,12
5. Water Supply, Sewerage, Waste Management and Remediation Activities	0,02	0,03	0,03	0,03	0,03	0,04	0,04
6. Construction	8,08	8,24	8,40	8,57	8,94	9,56	10,27
Tertiary Sector	**42,40**	**42,81**	**43,57**	**44,52**	**46,01**	**49,47**	**50,32**
7. Wholesale and Retail Trades, Repair of Motor Vehicles and Motorcycles	13,65	14,06	14,31	14,43	14,80	15,77	16,33
8. Transport and Storage	7,28	7,37	7,51	7,70	7,73	7,91	7,11
9. Accommodation and Food Service Activities	0,90	0,94	1,00	1,06	1,12	1,27	1,37
10. Information and Communication	3,23	3,19	3,27	3,23	3,17	3,18	3,08
11. Financial and Insurance Services	1,44	1,55	1,64	1,74	1,75	1,86	1,97
12. Real Estate Activities	3,10	3,12	3,12	3,18	3,43	3,80	3,88
13. Business Services	0,53	0,53	0,54	0,55	0,57	0,59	0,61
14. Public Administration and Defence; and Compulsory Social Security	7,08	6,95	6,98	7,29	7,91	9,03	9,61
15. Education	1,96	1,87	1,83	1,88	1,97	2,25	2,46
16. Human Health and Social Work Activities	2,13	2,12	2,22	2,30	2,36	2,52	2,58
17. Other Services Activities	1,11	1,12	1,14	1,16	1,20	1,29	1,33
Amount	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Statistic of Aceh Province, 2017.

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Table 3. Regional Economic Growth Performance is based on Shift-Share Analysis in Aceh, Indonesia: 2010-2016

No	Industrial Origin	Change in Economic (D_{ij})	Component of Economic Change				
			National Growth (G_{ij})	Industry Mix (M_{ij})	Competitive Advantage (hC_{ij})	Allocation Effect	
						A_{ij}	Code
1	Agriculture, Forestry, and Fishery	14.794,46	20.207,82	-1.135,82	-611,92	-3.665,63	1
2	Mining and Quarrying	-9.433,39	12.309,78	-8.494,86	-1.423,47	-11.824,84	1
3	Manufacturing	-1.626,43	7.096,51	-969,48	-1.754,89	-5.998,58	1
4	Electricity and Gas Supply	54,96	88,50	19,93	-0,58	-52,89	1
5	Water Supply, Sewerage, Waste Management and Remediation Activities	32,85	19,94	-6,57	0,02	19,46	4
6	Construction	5.888,50	6.482,74	2.166,34	-258,93	-2.501,65	1
7	Wholesale and Retail Trades, Repair of Motor Vehicles and Motorcycles	8.550,70	10.950,58	-267,99	-294,70	-1.837,19	1
8	Transport and Storage	2.368,51	5.836,36	6.260,48	-357,15	-9.371,18	1
9	Accommodation and Food Service Activities	963,64	719,45	16,95	6,81	220,43	4
10	Information and Communication	943,80	2.589,81	-117,59	-58,55	-1.469,86	1
11	Financial and Insurance Services	1.235,53	1.158,29	561,53	-17,37	-466,92	1
12	Real Estate Activities	2.181,93	2.487,70	-103,33	-6,00	-196,44	1
13	Business Services	295,46	426,10	186,50	-4,70	-312,43	1
14	Public Administration and Defence; and Compulsory Social Security	6.007,20	5.677,33	383,90	-2,10	-51,93	1
15	Education	1.386,44	1.572,98	567,69	-22,75	-731,49	1
16	Human Health and Social Work Activities	1.384,35	1.706,73	438,67	-7,57	-753,48	1
17	Other Services Activities	703,67	889,95	349,14	-57.331,84	56.796,42	1
Amount		**35.732,18**	**80.220,57**	**-144,48**	**-62.145,69**	**17.801,79**	
Percentage of D_{ij} Growth		**100**	**224,51**	**-0,40**	**-173,92**	**49,82**	

Based on the above table 3 can be explained that the component of national growth (G_{ij}) has a positive effect on economic growth in Aceh Province. This can be seen from the total value of positive national growth, in which there are 15 economic sectors that perform well in the economy, namely: agriculture, forestry and fishery sector; electricity and gas supply sector;

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water supply, sewerage, waste management and remediation activities sector; construction sector; wholesale and retail trades, repair of motor vehicles and motorcycles sector; transport and storage sector; accommodation and food service activities sector; information and communications sector; financial services and insurance services; real estate activities sector; public administration and defence, and compulsory social security sectors; education sector; health and social work activities sector; and other service activities sector. While the other two sectors are performing negatively. Those sectors are mining and quarrying sector; and manufacturing sector.

While the components of the industrial mix (M_{ij}) in general have a negative effect. This can be seen from the total value of negative industrial mix, especially in agriculture, forestry and fishery sector; mining and quarrying sector; manufacturing sector; water supply, sewerage, waste management and remediation activities sector; wholesale and retail trades, repair of motor vehicles and motorcycles sector; real estate activities sector. While in 10 other sectors positively affect the economic growth in the electricity and gas supply sector; construction sector; transport and storage sector; accommodation and food service activities sector; financial and insurance services sector; public administration and defence, and compulsory social security sector; education sector; health and social work activities sector; and other service activities sectors.

Furthermore, based on the components of competitive advantage (hC_{ij}), in general, the economic sector in Aceh does not have a competitive advantage. This can be seen from the total value of competitive advantage of negative value. However, there are still 2 sectors that have a competitive advantage, namely: water supply, sewerage, waste management and remediation activities sector; and accommodation and food service activities sector.

Based on the allocation effect (A_{ij}), in general, the economic sector in Aceh Province has a good allocation of GRDP for each sector. This can be observed from the total value of the positive-valued allocation effect. When viewed per sector, the other services activities sector has the highest profits, followed by the accommodation and food service activities sector; and water supply, sewerage, waste management and remediation activities sectors.

DISCUSSION

Based on the criteria of positional allocation effect positions (Olsen and Herzog, 1977) above, it can be explained that at the end of the observation year there are only two sectors that have a competitive advantage and specialize. These sectors are water supply, sewerage, waste management and remediation activities sectors; and the accommodation and food service activities sectors. While the other 15 sectors in the economy in Aceh Province do not have a competitive advantage but specialize compared to the same sector at the national level. This is due to the decreasing contribution of primary and secondary sectors. Mainly triggered by decreased production from the mining and quarrying sectors, and the manufacturing sector. Products from both sectors are products derived from non-renewable natural resources.

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CONCLUSION

During the period of observation, the rate of growth of the regional economy in the province of Aceh tends to decrease. The decrease in production in the primary and secondary sectors has led to a decrease in the contribution of the sector to the formation of GRDP. This has led to a decrease in the rate of economic growth. The decrease in the contribution to the tertiary sector is due to decreased performance in the mining and quarrying sectors due to decreased oil and gas production. The condition has also led to a decrease in national economic growth. This condition illustrates clearly the transformation of economic structure in Aceh Province.

Based on the results of shift-share analysis also shows that in general economic sectors in Aceh Province also does not have a competitive advantage. However, most of its economic sectors still specialize compared to the same sector at the national level. Nevertheless, there are still two sectors that have a competitive advantage and specialize, namely the water supply, sewerage, waste management and remediation activities sector; and the accommodation and food service activities sector.

To restore economic performance in Aceh province, the government needs to make a breakthrough, among others by increasing infrastructure development, especially the provision of electricity capacity, inter-district road access, and create a conducive investment climate. Thus it can attract investors to invest. So that investment injection, either through DDI and FDI directly will encourage economic growth.

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