

ANALYSIS OF CHANGES IN THE SECTORAL ECONOMIC STRUCTURE THROUGH CALCULATION OF AMBON CITY STRUCTURAL CHANGE INDEX IN 2015-2020

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ABSTRACT

With the use of the Structural Change Index, this study aims to analyze changes in Ambon city's economic structure for the period of 2015-2020. From the analysis, it can be concluded that; Based on the calculation of the Structural Change index, there has been a change in Ambon City's economic structure which is indicated by the contribution shifting from the primary sector to the secondary and tertiary sectors in the economy of Ambon City.

The changes by a sectoral shift from the primary sector to the secondary sector to the tertiary sector with an index of 0.64 percent means that 0.64 percent of economic resources are allocated between sectors, in which the tertiary sector develops faster than the primary and secondary sectors by using 0,64 percent of the total sectoral output in Ambon City.

Keywords: Structural Change Index, Primary, Secondary and Tertiary Sectors

ABSTRAK

Dengan menggunakan Indeks Perubahan Struktural, penelitian ini bertujuan untuk menganalisis perubahan struktur ekonomi kota Ambon periode 2015-2020. Dari hasil analisis dapat disimpulkan bahwa; Berdasarkan penghitungan indeks Perubahan Struktural, telah terjadi perubahan struktur perekonomian Kota Ambon yang ditandai dengan bergesernya kontribusi dari sektor primer ke sektor sekunder dan tersier dalam perekonomian Kota Ambon.

Perubahan sektoral yang bergeser dari sektor primer ke sektor sekunder ke sektor tersier dengan indeks 0,64 persen berarti 0,64 persen sumber daya ekonomi dialokasikan antarsektor, dimana sektor tersier berkembang lebih cepat daripada sektor primer dan sekunder dengan menggunakan 0,64 persen dari total output sektoral di Kota Ambon.

Kata Kunci : Indeks Perubahan Struktural, Sektor Primer, Sekunder, dan Tersier

INTRODUCTION

Economic development is the economic growth in addition to change. This implies an indication that whether economic development exist or not within a country in a certain year does not only measured by the increase in the production of goods and services that applies from year to year, but also needs to be measured by the other changes that apply in various aspects of economic activity such as educational and technological developments, health, available infrastructure, and people's income as well as welfare improvements (Sukirno 2006: 10).

Economic growth as one of the indicators towards development success of a country or region can be interpreted as a quantitative measurement that can provide an overview of the economic development in a given year compared to the previous year. Therefore, economic growth is an utmost requirement for the continuation of the development process as an effort to improve people's welfare.

In the development process, economic growth which occurs in a country or region is always accompanied by structural changes of its production. These structural changes can be seen from the percentage level of value-added on GDP to the economic sector, particularly the agricultural and industrial sectors, in which the contribution of these sectors is a measurement in determining to what extent the changes in the economic structure have occurred and to what extent the industrialization stage has progressed. Therefore, if there are no changes in its

economic structure, then the industrialization as the motor of structural transformation would not function properly.

The structural transformation of the economy will automatically become obvious, and the economy will inevitably shift from a traditional agricultural economy which centered in rural areas to a modern industrial economy which oriented on urban life patterns.

Indonesia development is also succeeded in stimulating high economic growth, which is indicated by changes in the economic structure. The changing process of the economic structure is shown by: (1) declining share of the primary sector (agriculture), (2) increasing share of the secondary sector (industry), and (3) the share of the tertiary sector (services) is roughly constant, but its contribution will increase aligned with the economic growth (Lewis in Todaro 2004).

Based on 2019 BPS report, the economic growth in Indonesia was 5.02 percent lower than 2018 growth of 5.17 percent with the acquirement of Gross Domestic Product (GDP) at the current price of IDR 15 833.9 trillion and the GDP per capita level reaches IDR 59.1 million or US \$ 4 174.9. Spatially for 2020, because of the global covid-19 pandemic circumstances, the Indonesian economy suffers contraction or minus of 2.07 percent. Meanwhile, Sulawesi Island experienced positive growth of 0.23%, with a contribution to gross domestic product (GDP) of 6.66 percent. Maluku and Papua Islands by 1.44 percent with a contribution to gross

domestic product (GDP) of 2.35 percent (BPS, 2021).

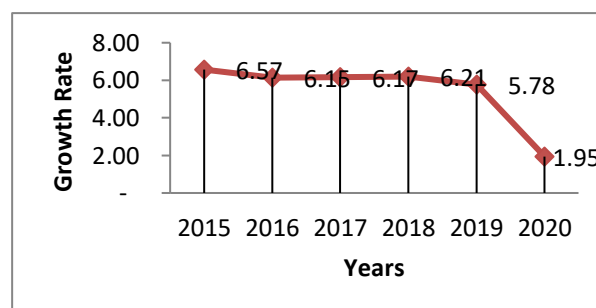
As an integral part of Indonesia's National development, economic development in Ambon City as the Capital of Maluku Province has increased in its Gross Domestic Product. Gross Regional Domestic Product (GRDP) at the regional (province) level which describes the ability of a region to create value added in a certain time can be detailed according to the total value added of all economic sectors which include business fields such as Agriculture, Forestry and Fisheries; Mining and Quarrying; Manufacturing Industry; Electricity and Gas Procurement; Water Supply, Waste Management, Sewerage, and Recycling; Construction; Wholesale and Retail Trade, Automobile and Motorcycle Repair Services; Transportation and Warehousing; Provision of Accommodation and Foods; Information and Communication; Financial and Insurance Services; Real Estate; Business Services; Public Administration, Defense and Compulsory Social Security; Education Services; Health Services and Social Activities; and other Services.

Ambon City's Gross Regional Domestic Product at constant prices is gradually increased from 2015-2019, but the rate of economic growth is fluctuated, where in 2015, the economic growth rate was 6.57 percent, 2016 was 6.15 percent, 2017 was 6.17 percent, 2018 was 6.21 percent, and in 2019, the economic growth rate was 5.81 percent in which the economic sectors that made the biggest contribution during these periods were

the sectors of Wholesale and Retail Trade, Automobile and Motorcycle Repair Services.

The rate of economic growth in Ambon City is fluctuated up to 2019, and there are five biggest contributing sectors to GRDP, which are: The education service sector by 7.83 percent, the wholesale and retail trade / automobile and motorcycle repair services sectors by 7.37 percent, the other services sectors by 7.05 percent, the public administration, defense, and compulsory social security sectors by 6.92 percent, as well as mining and quarrying sectors by 6.63 percent. Meanwhile, the sector with a significantly small growth rate was the electricity and gas procurement sector by 0.47 percent. The economic growth rate in 2020 is only 1.95 percent. The main cause of the declining growth rate is due to the influence of the Covid-19 pandemic which has an impact on decreasing economic activity in Ambon City.

Picture 1. Ambon City's Economic Growth Rate in 2015-2020

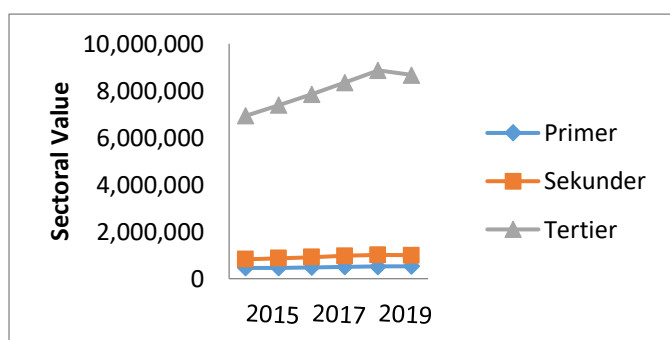


Source : BPS of Ambon City, 2021

Meanwhile, an overview of the economic sector contribution in Ambon City has shown that in the aggregate, there is a change in the

share of the output value or value added of each sector in the form of the gross regional domestic product, which is indicated by; a decline in the agricultural sector share (primary), an increase in the industrial sector (secondary) and the service sector (tertiary) which is roughly constant aligned with economic growth will experience an increase.

Gambar 2. Ambon City Sectoral Value-Added in 2015-2020



Source : BPS of Ambon City in 2021.

Several empirical research results have also attested the phenomenon that always appears in every process of structural changes in a country or region which is always indicated by a transition and shift from primary production sector activities (agriculture, mining) to the secondary sector (manufacturing industry) and to the tertiary sector (services).

Based on the presented background, the problem in this writing is whether there is a change in the activity of the economic structure in Ambon City which is indicated by a decline in the market share of the primary sector and an increase in the secondary and tertiary sectors share.

The targeted research objective is to determine whether there has been a change in

the activity of Ambon City's economic structure in 2015-2020.

METHODOLOGY.

1. Theory of Structural Change

Economic development in the long-term period following the growth of national income will bring a fundamental change in the economic structure from an agricultural traditional economy as the main sector to a modern sector which is dominated by non-primary sectors, specifically the manufacturing industry with increasing returns to scale (positive relationship between output growth and productivity growth) that is dynamic as the main force in driving economic growth, in which leading to a visible tendency towards a hypothesis that the higher the annual average economic growth rate, the higher or faster the economic structure changes with the assumption that other determinants are as support, such as labors, raw materials, and available technology (Tambunan 2009: 62)

The theory of structural change focuses on discussing the mechanisms of economic transformation experienced by developing countries, which are initially more subsistence to a more modern economic structure dominated by the industrial and service sectors (Todaro, 2004: 133). Kuznet defines changes in the economic structure which are generally referred to structural transformations as a series of changes that are interrelated with one another in the composition of aggregate demand, foreign trade (exports and

imports), aggregate supply (production and use of production factors needed to support the development process and sustainable economic growth) (Chenery, 1979).

2. Lewis's Two-Sector Model

In Lewis theory concept, it is assumed that the economy of a country is basically divided into two, that are the rural economy which is still traditional in nature and dominated by the agricultural sector, and the modern urban economy with the industrial sector as the main driver. For rural areas, people's lives are still in a subsistence condition with a high population growth rate, resulting in excess labor. This excess labor effects in a low level of wages and a marginal product of zero value. On the other hand, for urban areas, labor productivity is extremely high and the marginal value of the labor product is positive and has an impact on labor shortages, which indicates that the production function is not yet at an achieved optimal level.

Due to the difference in the level of labor wages in these two sectors, that resulting in a large attractiveness of urban areas, it eventually makes many labors have to move (migration) from the agricultural sector to the industrial sector. Because the unlimited stock of labor in the agricultural sector, the industrial sector is able to develop by drawing unlimited labors from the agricultural sector. When the labor marginal productivity of the industrial sector in urban areas is higher than the wages they receive, it thus resulting in the

establishment of a surplus in the industrial sector. The industrial sector surplus from the difference in wages received is then completely reinvested and the wage level in the industrial sector is assumed to be constant and the amount is set to exceed the average wage level in the agricultural sector. And Lewis assumes that the wage rates in urban areas must be at least 30 percent higher than average rural labor income, to force migration of labors moving from rural to urban areas.

3. Chenery model

The most well-known model of structural change is a model based on empirical research from Hollis B. Chenery, which specifically conducted a research to investigate development patterns in a number of third world countries during the post-Second World War period. The empirical study was conducted by cross sectional (between countries in a certain period) and time series (covering a certain number of countries over a long period of time). Chenery takes developing countries with various levels of income per capita as materials to identify characteristics that might have a major influence on the success of their development process. The study materials include the transition and pattern of an agrarian economy to an industrial economy, the accumulation continuity of physical and human capital, changes in the types of consumer demand from staple goods and food products to various kinds of manufactured goods and services, the development of urban areas, especially

industrial centers due to the migration of job seekers from rural agricultural areas and small towns, as well as a number reduction of members in each family and an overall decrease of population growth.

Chenery also focuses its attention on the gradually changing process of the economic, industrial, and institutional structures in an underdeveloped economy, in which enabling the emergence of new industries to replace the position of the agricultural sector as a driving force for economic growth (Tambunan 2009: 64).

Based on this point, the increase of production in the manufacturing industry sector is stated equally to the number of the following four factors:

1. Increase of domestic demand, which includes direct demand for manufactured industrial products plus the indirect effect of increased domestic demand for products from other sectors on the manufacturing industry sector.

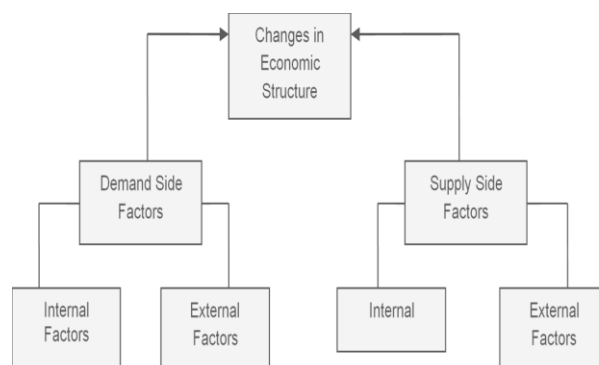
2. Expansion of exports, or the total effect of increasing number of exports on the products of the manufacturing industry.

3. Substitution of Imports, or the total effect of increasing proportion of demand in each sector that is fulfilled through domestic production on the output of the manufacturing industry.

4. Changes of technology, or the total effect of changing of the input-output coefficient in the economy due to the increased wages and income levels on the manufacturing industry sector.

The theory of structural change also explains that the accelerations and patterns of transformation that occur in a country are influenced by external and internal factors that are interrelated with one another. The factors that cause changes in the economic structure can be differentiated into factors from the Aggregate Demand (AD) and Aggregate Supply (AS) sides, as well as being influenced directly or indirectly by government intervention in daily economic activities. In Figure 3, from the Aggregate Demand side, the influential dominant internal factor is changes in domestic demand caused by a combination of increasing real income per capita of the community and changes in people's tastes. Meanwhile, the policy that has a direct effect is the sales tax policy, which makes the selling price expensive. While a policy that has an indirect effect is a reduction of income tax (*ceteris paribus*), which could increase consumption of products from certain sectors such as manufacturing and services.

Figure 3. Factors which Cause Changes in the Economic Structure



Source : Tambunan,2001

Furthermore, from the Aggregate Supply side, internal factors that influence include a shift in comparative advantage, changes or advancements of technology, education enhancements, or the quality of human resources, new innovations in production, and the accumulation of capital goods. In government intervention, policies that have a direct effect on changes in the economic structure are policies that provide incentives for the industrial sector or indirectly through the provision of infrastructure. The factors from the Aggregate Demand and Aggregate Supply sides above are the internal factors, while the external factors that cause changes in the economic structure include advancements of technology and changes in the structure of global trade.

The general calculation used to measure structural change in output is by calculating the coefficient (composition) of an index which is often referred as the Structural Change Index (Dietrich, 2009) with the following formula

$$NAV = \frac{1}{2} \sum |x_{i,t} - x_{i,t-1}|$$

Wherein $x_{i,t}$ and $x_{i,t-1}$ is the share of each sector at the time (t) and (t-1). The used value is an absolute value, which means that when the values of change in the share of each sector are added up, the negative and positive marks are ignored. The SCI value is limited between zero and 100, in which if zero means there is no structural change, and if 100

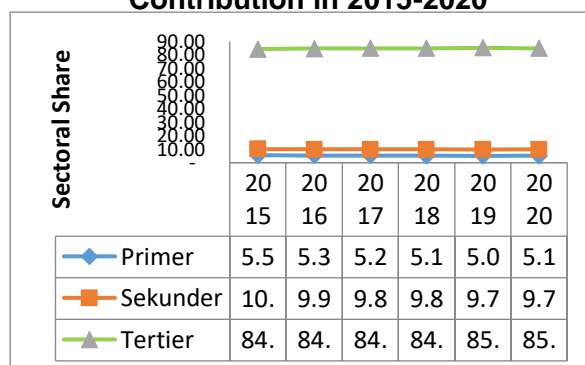
indicates a flawless reversal of the structure (OECD 1994, in Janissen et al, 1998).

RESULT

The economic growth of a country or region causes changes in the economic structure. Economic transformation itself is a process of structural change of the economy that shifting from the agricultural sector to the industrial or service sector, in which each sector of the economy undergoes different transformations. Syrquin (1985) states that there is a strong relationship between growth and structural change.

The implementation of development in Ambon City has also brought the changes in the economic structure even though these changes are not significantly massive. Until 2020, the contribution of the economic sector in Ambon City has defined that the primary sector consisting of the agriculture, forestry and fisheries sectors contribute to 5.16 percent. The secondary sector is 9.79 percent, and the tertiary sector is 85.04 percent. All in all, the tertiary sector is the largest contributor to the economic growth in Ambon City.

Figure 4. Ambon City's Sectoral Contribution in 2015-2020



Source : BPS of Ambon City in 2021

Meanwhile, based on the results of the structural change index calculation, the measurement results of changes in Ambon City's economic structure in 2015-2020 can be seen and explained as follows :

Table 2. Ambon City Structural Change Index in 2002-2003

Industry	Value Added		Industry Output			SCI
	2015	2016	Share (%)		Change	
			2015	2016	%	
Primary	457,853	464,490	5.58	5.33	(0.25)	
Secondary	822,517	866,020	10.02	9.94	(0.08)	
Tertiary	6,929,665	7,384,490	84.40	84.73	0.33	
Total	8,210,034	8,715,000	100	100		0,33

Source: Research Results, processed data

In 2015-2016, Ambon City Structural Change Index was amounted to 0.33 percent, where the tertiary sector is still developing compared to the primary and secondary sectors. The contribution of the primary and secondary sectors is increased, but this increase has brought negative transformations to changes in Ambon City's economic structure.

While in 2016-2017, structural change index was 0.15 percent, which means that the tertiary sector uses 0.15 percent of the city's output, while other sectors, in which the primary sector and the secondary sector, experience a decline.

Table 3. Ambon City Structural Change Index in 2016-2017

Industry	Value Added		Industry Output			SCI
	2016	2017	Share (%)		Change	
			2016	2017	%	
Primary	464,490	486,200	5.33	5.25	(0.07)	
Secondary	866,020	912,100	9.94	9.86	(0.08)	
Tertiary	7,384,490	7,854,160	84.73	84.89	0.15	
Total	8,715,000	9,252,460	100	100		0,15

Source : Research Results, processed data

In 2017-2018, the index figure was 0.05 percent and decreased 0.10 percent from the previous year. This shows that only 0.05 percent of economic resources are allocated between sectors. In this case, the tertiary sector has indeed increased, but the increase is lower than the previous year. While the primary sector is decreased by 0.07 percent and the secondary sector is increased by 0.02 percent.

Table 4. Ambon City Structural Change Index in 2017-2018

Industry	Value Added		Industry Output			SCI
	2017	2018	Share (%)		Change	
			2017	2018	%	
Primary	486,200	509,420	5.25	5.18	(0.07)	
Secondary	912,100	970,520	9.86	9.88	0.02	
Tertiary	7,854,160	8,347,450	84.89	84.94	0.05	
Total	9,252,460	9,827,390	100	100		0,05

Source : Research Results, processed data

In 2019, the structural change index has increased by 0.29 percent from 2018. The increase is still contributed from the tertiary

sector by 0.34 percent. While for the primary and secondary sectors, sectoral contributions have increased, but the changes show a decline.

Table 5. Ambon City Structural Change Index in 2018-2019

Industry	Value Added		Industry Output			SCI
	2018	2019	Share (%)	Change	%	
Primary	509,420	519,820	5.18	5.00	(0.18)	
Secondary	970,520	1,009,760	9.88	9.71	(0.16)	
Tertiary	8,347,450	8,865,390	84.94	85.29	0.34	
Total	9,827,390	10,394,970	100	100		0,34

Source : Research Results, processed data

For the period of 2019-2020, the structural change index was 0.10 percent, which means that the tertiary sector uses 0.10% of the city's output, while other sectors experience a decline.

Table 6. Ambon City Structural Change Index in 2019-2020

Industry	Value Added		Industry Output			SCI
	2019	2020	Share (%)	Change	%	
Primary	509,420	526,070	5.18	5.16	(0.02)	
Secondary	970,520	998,320	9.88	9.79	(0.08)	
Tertiary	8,347,450	8,667,980	84.94	85.04	0.10	
Total	9,827,390	10,192,370	100	100		0.10

Source : Research Results, processed data

For the period of 2015-2010, changes in Ambon City's economic structure based on the measurement of the structural change index

during the period of 5 years, the structural change index was only 0.64 percent. This implies that for the production sector which includes 17 main sectors classified into the primary sector, the secondary sector, and the tertiary sector, only 0.64 percent of the economic resources are allocated between sectors. In this case, the tertiary sector develops faster than other sectors by using 0.64 percent of the city's total output, while the contribution of the primary and secondary sectors is increased by 85.04 percent, but the structural change index is decreased.

Table 7. Ambon City Structural Change Index in 2015-2020

Industry	Value Added		Industry Output			SCI
	2015	2020	Share (%)	Change	%	
Primary	457,853	526,070	5.58	5.16	(0.42)	
Secondary	822,517	998,320	10.02	9.79	(0.22)	
Tertiary	6,929,665	8,667,980	84.40	85.04	0.64	
Total	8,210,034	10,192,370	100	100		0,64

Source : Research Results, processed data

DISCUSSION

The activity of Ambon City's economic structure in the period of 2015-2020 has undergone changes which is indicated by the decreasing contribution of the primary sector and the increasing contribution of the secondary and tertiary sectors.

The research findings also suggest that there has been a shift in Ambon City's economic structure, although in an excessively small composition, with a structural change index closes to 0. The calculation of the SCI value is

usually limited between zero and 100, in which if zero means there is no structural change and if 100 indicates a flawless reversal of the structure (OECD 1994, in Janissen et al., 1998).

Sukirno (2006: 10) states that economic development is the economic growth in addition to change. This implies an indication that whether economic development exist or not within a country in a certain year does not only measured by the increase in the production of goods and services that applies from year to year, but also needs to be measured from other changes that apply in various aspects of economic activity such as educational and technological developments, health, available infrastructure, people's income and welfare improvements.

In the relationship between economic growth in a region and changes in the economic structure, several components of changes in the economic structure that require attention include the gradual shift in agricultural to non-agricultural sector activities, in which structural change theory also focuses on mechanisms that allow underdeveloped countries to transform the economic structure from a subsistence agricultural economy to a more modern, urban-oriented economy with a strong manufacturing and service sector (Todaro 2003: 133). Thus, a high level of structural and sectoral change is also closely related to the process of economic growth, wherein one of the structural change components is a gradual shift from agricultural activities to the non-agricultural sector. In

measuring the structural change index that occurs in an area, it is also necessary to pay attention on the sectors grouping, selected time periods, and price movements so that the index numbers could remain clearly visible.

CONCLUSION

Through the measurement of the structural change index, the economic growth and sectoral contributions have attested that there has been a structural change in Ambon City, which is indicated by the contribution shifting from the primary sector to the secondary and tertiary sectors, and the development of the tertiary sector is faster than the primary and secondary sectors. The changes is also indicated by a sectoral shift from the primary sector to the secondary and the tertiary sectors with an index of 0.64 percent, which means that 0.64 percent of economic resources are allocated between sectors, in which the tertiary sector develops faster than the primary and secondary sectors by using 0,64 percent of the total sectoral output in Ambon City.

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