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Analysis of Economic Structure Transformation Based on Economic Sectors and Labor Absorption in North Sumatera Province

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Abstract

Economic growth has resulted in changes in the economic structure. Structural transformation is the process of changing the economic structure from the primary sector to the secondary or tertiary sectors, as seen in North Sumatera Province. The change in structure or economic transformation from traditional to modern can generally be seen as a change related to the composition of shifts in labor absorption and contributions to the Gross Regional Domestic Product (GRDP) of a region. The objective of this study is to analyze changes in economic structure and alignment in labor absorption in North Sumatera Province during the period 2017- 2022. Quantitative methods are used with the analytical techniques of Location Quotient, Chenery-Syrquin Index, and Shift Share. Economic sector and labor data were obtained from various official sources. The results show significant changes in regional economic structure during the period 201-2022, with certain sectors experiencing faster growth than others. Location Quotient analysis identifies the base sectors, while the Chenery-Syrquin Index provides a deep understanding of the growth and relative changes in economic sectors. Furthermore, Shift Share analysis reveals the contribution of each factor in the change in labor absorption. This study provides important insights for regional economic planning and the development of economic policies in North Sumatera Province.

Keywords: Base sectors; economic structure transformation; labor

1. Introduction

Economic structure is the ongoing economic system within a society, which describes the economic conditions of the community from the perspective of production. The economic structure itself will fundamentally change in line with the economic conditions of a region. The changes anticipated by the government in economic policies will be clearly reflected in the resulting economic structure.

The economic structure itself results from the economic development policies that are implemented. Economic development is a process of change that the government plans, with the expectation of having a direct impact on economic growth. The hope for economic development is that it can proceed continuously and dynamically. To realize these hopes effectively, breakthroughs and precise planning in the economic cycle are necessary. Nowadays, the identity of development aimed at achieving this is through sustainable economic development. [1].

Properly and consistently implemented development will eventually have a direct impact on high economic growth. It is this high economic growth that will lead to structural transformation, which is a prerequisite for poverty reduction. Based on this perspective, economic growth is an indication of the success of economic development. [2].

Changes in the economic structure, increased output, but not accompanied by changes in the labor structure, can certainly pose a problem in the process of regional economic development. In other words, income changes grow faster than changes in the labor structure. [3]

To address the issue of limited job opportunities, it is essential not only to focus on job creation but also to consider the demand for labor. The labor structure is closely related to Human Resources (HR). The improvement of Human Resources quality will be hampered if it is not accompanied by advancements in infrastructure, whether through education or healthcare.[4]

The fundamental issue in regional development lies in emphasizing development policies based on the specific characteristics of the region in question (endogenous development) by utilizing local human resources, institutions, and physical resources. This orientation directs us towards adopting initiatives originating from the region itself in the development process to create new job opportunities and stimulate increased economic activity. [5]

Table 1. Gross Regional Domestic Product at Constant 2010 Prices by Economic Sector in North Sumatra Province for the Years 2018-2022 (billion rupiah)

Year	GRDP
2018	512.762,63
2019	539.513,85
2020	533.746,36
2021	547.651,82
2022	573.528,77

Source: Researcher Processed Data

Based on Table 1, the Gross Regional Domestic Product at constant 2010 prices in 2022 was 573.53 billion rupiah. From 2018 to 2022, the Gross Regional Domestic Product at constant 2010 prices showed positive growth, although there was a contraction in 2020. Compared to other provinces on the island of Sumatra, North Sumatra ranked second in 2022 with 22.63 percent, and 4.99 percent relative to the national GDP.

Economic structural changes or economic transformation are also key dimensions with a significant impact on economic development. The economic development process will bring about fundamental changes in the economic structure, both from the perspective of aggregate demand and aggregate supply. The ideal condition for economic growth is when economic growth can more significantly impact labor force growth, leading to optimal employment absorption, particularly across various economic sectors. [6].

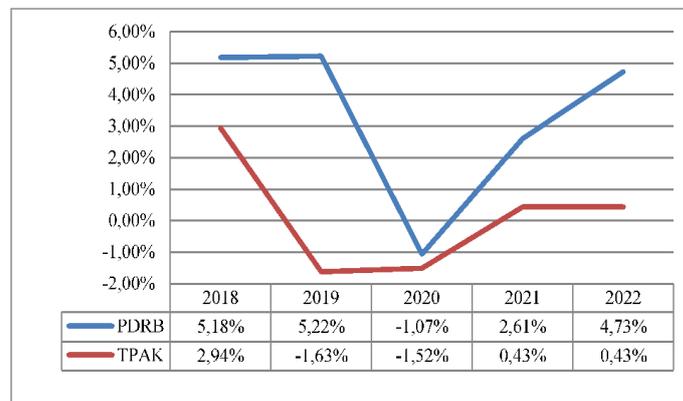


Figure 1. Growth Rate of Gross Regional Domestic Product and Employment Absorption in North Sumatra Province for the Years 2018-2022

The graph shows that between 2018 and 2022, there were anomalies in the rates of economic growth and labor absorption. Despite high or stagnant economic growth, labor growth was not aligned. The transformation from agriculture to industry has lagged, so agriculture remains crucial in providing labor. As a result, labor productivity in agriculture will rise, approaching the productivity of the industrial sector, and ultimately improving overall labor productivity.

This study aims to analyze the economic structure and labor absorption in North Sumatra Province and examine its shifts. The use of location quotient analysis is intended to assess the productivity of the most dominant sectors in North Sumatra. Additionally, the study seeks to evaluate the development of each major sector in North Sumatra using the Chenery-Syrquin index. Labor absorption is measured through shift-share analysis. Identifying sectors with high productivity and their capacity for labor absorption is expected to assist the government in creating better regional planning. Ultimately, this should lead to improved economic growth in North Sumatra and contribute to enhanced well-being in the long term.

2. Literature Review

2.1 Gross Regional Domestic Product (Times New Roman, Size 10, Italic, Spacing Before dan After 6pt)

Gross Regional Domestic Product (GRDP) is a crucial metric for evaluating the economic performance and structural dynamics of sub-national regions. Unlike Gross Domestic Product (GDP), which aggregates economic activity at a national level, GRDP provides a detailed insight into the economic contributions and trends at a regional level. [7].

2.2 Structural Change Theory

According to the [8], structural change theory emphasizes the mechanisms of economic structure transformation in developing countries, where the production focus relies on the agricultural sector or is subsistence-based. This production focus will eventually transform towards the industrial and service sectors, which are urban-oriented and more modern.

2.3 Chenery-Syrquin Patterns of Development Theory

The Patterns of Development Theory, proposed by Chenery, focuses on structural changes in the stages of economic, industrial, and institutional transformation in an underdeveloped economy. This process allows new industries to emerge and replace the agricultural sector as the main driver of economic growth. The most important aspect of Chenery's model is that the analysis shows the quantitative relationship between per capita income and the percentage contribution of different economic sectors to national income. Chenery places greater emphasis on the changing role of industry in generating national production. [9]

2.4 Labor

According to [10], labor refers to individuals who can be utilized in the production process, encompassing their physical condition, skills, and cognitive abilities. The provision of job opportunities is one of the goals of economic development, particularly in Indonesia, where the growth of the labor force exceeds the growth of job opportunities. Increasing and improving economic development will enhance labor absorption, thereby affecting the availability of labor in a region. There are two factors influencing labor conditions: demand factors (affected by economic development dynamics) and supply factors (determined by company structures and population demographics).

3. Research Method

The type of data used is secondary data, namely data or information obtained from other parties other parties, in the form of data that supports this research. Secondary data used is a combination of time series from 2009-2016 and latitude series from 2009-2016. series from 2009-2016 and cross section as much as 32 data representing 4 years as much as 32 data representing 4 provinces on the island of Java, namely West Java Province West Java, Central Java, East Java, and Yogyakarta.

This study uses one variable dependent variable and three independent variables. The dependent variable in this study is poverty rate (P), while the independent variables in this study are education (E), unemployment (U), and LogPDRB (E). The GRDP variable uses Log because there is a nonlinear relationship between the independent variable and the dependent variable, so the GRDP variable must be Log in order to make the non-linear relationship non-linear relationship can be used in the linear model in order to make the regressed model better [7]). For the model that will be used to determine poverty in the provinces of West Java, Central Java Central Java, East Java, and Yogyakarta from 2009 to 2016:

$$P = \alpha + \beta_1 X_1 + \epsilon$$

4. Results and Discussion

4.1 Economic Growth of North Sumatera Province

Between 2017 and 2022, North Sumatera Province's GDP at constant prices experienced various changes reflecting the province's economic dynamics. The percentage growth of North Sumatra's GDP from 2017 to 2022 increased by 4.70% annually, compared to the national average of 4.57%. This indicates that, over the past twelve years, some sectors in North Sumatra have performed better than the national average. Although the total GDP value has increased, the growth rate did not follow the same trend, especially in 2020, which saw a decline due to the pandemic that significantly impacted all aspects of life.

4.2 Base Sectors of North Sumatera Province

Table 1. Location Quotient Results for Base Sectors in North Sumatera Province 2017-2022.

Sector	2017	2018	2019	2020	2021	2022	Average
Agriculture, forestry and fisheries	1.96	1.98	2.01	2.01	2.05	2.11	2.02
Mining and excavation	0.17	0.18	0.18	0.18	0.17	0.17	0.17
Processing industry	0.90	0.89	0.87	0.88	0.87	0.85	0.88
Electricity and gas procurement	0.14	0.13	0.13	0.14	0.14	0.14	0.14
Wayer procurement, garbage, waste and recycling management	1.21	1.18	1.16	1.14	1.14	1.13	1.16
Construction	1.26	1.25	1.27	1.25	1.26	1.28	1.26
Retail and wholesale trade car and motorcycle repair	1.32	1.34	1.37	1.38	1.38	1.40	1.37
Transportation and warehousing	1.15	1.14	1.13	1.15	1.08	1.03	1.11
Accomodation and food provision	0.77	0.78	0.80	0.80	0.78	0.75	0.78
Information and communication	0.52	0.53	0.53	0.50	0.51	0.51	0.52
Financial and insurance services	0.74	0.73	0.69	0.67	0.70	0.72	0.71
Real estate	1.45	1.48	1.46	1.43	1.45	1.49	1.46
Corporate services	0.70	0.51	0.49	0.48	0.49	0.49	0.52
Government administration, defense and social security	0.96	0.96	0.98	0.98	1.01	0.99	0.98
Education services	0.61	0.61	0.61	0.61	0.64	0.66	0.62
Health services and social activities	0.87	0.86	0.83	0.72	0.66	0.68	0.77
Other Services	0.30	0.29	0.28	0.28	0.28	0.28	0.28

Source: Researcher Processed Data

Based on Table 4.1 above, there are six base sectors with an LQ (Location Quotient) value greater than 1, namely: 1) Agriculture, Forestry, and Fisheries with an average value of 2.02; 2) Real Estate with a value of 1.46; 3) Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles with a value of 1.37; 4) Construction with a value of 1.26; 5) Water Supply, Waste Management, Waste Treatment, and Recycling with a value of 1.16; and 6) Transportation and Warehousing with a value of 1.11. The analysis results indicate that not all economic sectors are able to positively impact other economic sectors ($LQ < 1$). This is evident from other sectors that have an $LQ < 1$, including: Mining and Quarrying; Manufacturing; Electricity and Gas Supply; Accommodation and Food Service Activities; Information and Communication; Financial and Insurance Activities; Professional, Scientific, and Technical Activities; Public Administration, Defense, and Social Security; Education; Health and Social Work; and Other Service Activities.

4.3 Transformation of The Economic Structure of North Sumatera Province

4.3.1 Primary Sector

Table 2. Development of The Primary Sectors in North Sumatera Province 2017-2022.

Year	Primary Sector (Billion Rupiah)	Economic Growth (%)
2017	127.740,6	5,29
2018	133.994,7	4,90
2019	140.825,8	5,10
2020	143.263,1	1,73
2021	148.670,3	-3,77
2022	156.012,5	4,94
<i>Average</i>		4,28

The average growth rate of the primary sector from 2017 to 2022 is 4.28%, with the highest negative growth occurring in 2020 at -3.37% compared to the previous year, and the highest growth achieved in the following year, 2021, which increased by 2.04% due to the recovery from the Covid-19 pandemic.

4.3.2 Secondary Sector

Table 3. Development of The Secondary Sector in North Sumatera Province 2017-2022

Year	Secondary Sector (Billion Rupiah)	Economic Growth (%)
2017	155.106,1	4,07
2018	161.865,9	4,36
2019	167.819,2	3,68
2020	164.679,0	-1,87
2021	167.572,6	1,76
2022	171.622,8	2,42
<i>Average</i>		3,03

From 2017 to 2022, this sector experienced sharp fluctuations, with the highest growth being 4.36% in 2018, while negative growth occurred in 2020 at -1.87%, with an average growth rate of 3.03% for this sector. This was due to the impact of economic crises, both past and present, in North Sumatra Province, which reached a worst-case scenario, severely affecting the secondary sector.

4.3.3 Tertiary Sector

Table 4. Development of The Tertiary Sectors in North Sumatera Province 2017-2022

Year	Tertiary Sector (Billion Rupiah)	Economic Growth (%)
2017	204.684,5	5,83
2018	216.902,1	5,97
2019	230.868,9	6,44
2020	225.804,0	-2,19
2021	231.409,0	2,48
2022	245.893,5	6,26
<i>Average</i>		4,86

According to the Chenery-Syrquin theory, the growth of this sector is consistent with the economic structure of North Sumatra Province, which shows that the contribution of the primary sector to national income during the period from 2017 to 2022 has experienced changes or declines each year, accompanied by an increase in the contribution of the secondary and tertiary sectors. Although the value of the primary sector's GRDP (Gross Regional Domestic Product) is still greater than that of the secondary and tertiary sectors.

4.4 Labor Absorption in North Sumatera Province

Changes in total GRDP can be attributed to three components: National Growth Component (PN), Proportional Growth Component (PP), and Regional Share Growth Component (PPW). Based on the Shift-Share Analysis method, the research results on employment absorption due to changes in the economic structure of North Sumatera Province can be seen in the graph below:

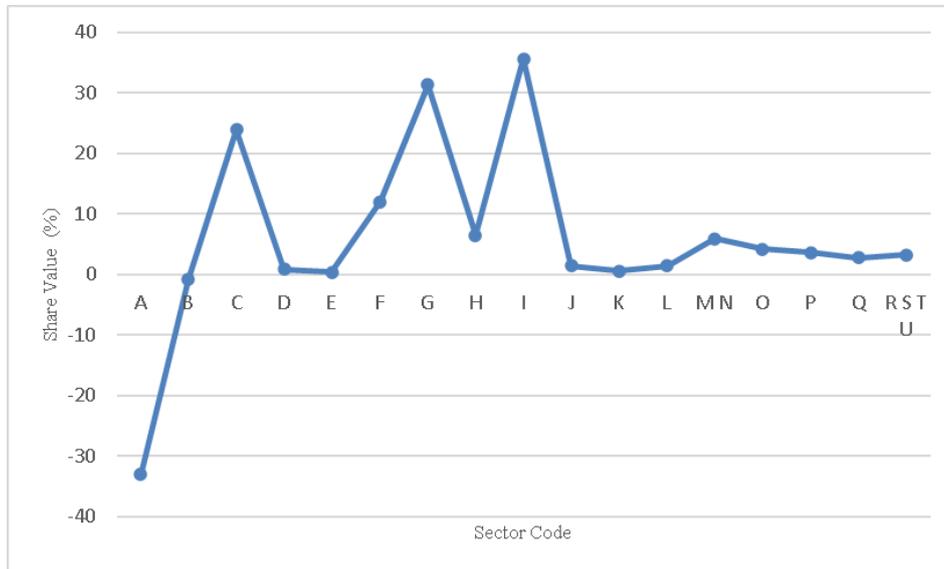


Figure 2. Total Value of Shift-Share Analysis of Employment Absorption in North Sumatera Province 2017-2022

Note : A) Agriculture, Forestry, and Fisheries; B) Mining and Quarrying; C) Manufacturing; D) Electricity and Gas Supply; E) Water Supply, Waste Management, and Recycling; F) Construction; G) Wholesale and Retail Trade, and Repair of Motor Vehicles and Motorcycles; H) Transportation and Warehousing; I) Accommodation and Food Services; J) Information and Communication; K) Financial and Insurance Services; L) Real Estate; M N) Professional, Scientific, and Technical Services; O) Public Administration, Defense, and Social Security; P) Education Services; Q) Health and Social Work Services; R S T U) Other Services.

Based on figure 2, it can be seen that there has been a significant shift in the regional economic structure affecting employment absorption. The Agriculture, Forestry, and Fisheries sector shows a decrease in contribution, with growth slower than the national average, indicating a decline in employment absorption and a shift of labor to other sectors. In contrast, the Real Estate and Wholesale and Retail Trade sectors experienced positive growth due to increased local market demand and urbanization, which supports greater employment absorption. The Construction sector also saw favorable growth, driven by infrastructure investments creating many job opportunities. Meanwhile, the Water Supply, Waste Management, Waste Treatment, and Recycling sector, as well as the Transportation and Warehousing sector, show moderate growth, supporting basic needs and regional infrastructure, making these sectors the largest tertiary sectors absorbing labor in North Sumatera Province. To determine which regression model is chosen between fixed effect or common effect in this study, the Chow Test is required. Chow Test. The following are the results of the Chow Test:

Table 2. Result of Chow Test

Effect Test	Statistic	d.f	Prob.
Cross Section F	5.685244	(3.25)	0.0041
Cross Section Chi Square	16.643835	3	0.0008

Source: Researcher Processed Data

Based on table 5, it can be explained that the regression model uses a fixed effect model. effect model can be seen from the probability value which are 0.0041 and 0.0008, both of which are smaller than the α value of 0.05. smaller than the α value of 0.05. This means that the model equation has heterogeneity in a fixed way.

5. Conclusions

This study finds that economic growth in North Sumatera from 2017 to 2022 has not been accompanied by proportional changes in labor structure. The rapid sectoral economic shifts exceed the pace of labor adjustments, with the economic turning point

occurring before the labor turning point, as noted by Manning (1995). The Location Quotient (LQ) analysis indicates that while the primary sector, especially Agriculture, Forestry, and Fisheries, remains strong, the tertiary sector, including Real Estate and Wholesale and Retail Trade, shows significant contributions. The Construction sector also plays a key role in infrastructure development. However, Water Supply, Waste Management, and Transportation sectors are still developing compared to others. The Chenery-Syrquin Index confirms that the primary sector's growth is below that of the secondary and tertiary sectors. The Shift-Share Analysis further reveals that while Agriculture, Forestry, and Fisheries have seen decreased contributions and slower growth, sectors like Real Estate and Construction have experienced positive growth and increased labor absorption. Overall, these trends indicate potential for further economic development in North Sumatra.

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