

The Effect of GRDP Sector Composition on Economic Growth in the Lake Toba Region

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Abstract

This study aims to analyze the effect of 17 economic sectors on economic growth in the Lake Toba Region (KDT). The data used is secondary data in the form of times series from 2010 to 2019 with panel data analysis using Fixed Model Effect (FEM). It shows a positive and significant influence between mining, energy, information, finance, and health sectors on KDT economic growth, while the other 12 economic sectors have no significant effect. An increase of 1 percent in the mining sector will incline economic growth by 1.41 percent; the energy sector will promote economic growth by 0.48 percent; the information sector will increase economic growth by 0.81 percent; the financial sector will increase economic growth by 0.78 percent; and the health sector will enhance economic growth by 1.10 percent. The government should make policies related to production and investment enhancement so that the income of each economic sector and economic growth in KDT increases.

Keywords: Economic growth, Economic sector, Panel data

JEL Classification: C01, C33, O11

INTRODUCTION

The Lake Toba Region (KDT) is geographically located in North Sumatera inhabited by seven regencies that are directly adjacent; North Tapanuli, Toba, Simalungun, Dairi, Karo, Humbang Hasundutan, and Samosir. As an area blessed with the beauty of Lake Toba, Indonesia Government has designated Lake Toba as one of the national tourist destinations and has launched some development programs to achieve these goals. The continued impact of the declaration of this tourist destination is to achieve the prosperity of KDT society.

Based on economic growth in 2001-2017, the average real economic growth in North Sumatera is 5.52 percent. In addition, the average economic growth of each district in KDT is as follows: North Tapanuli 5.08 percent; Toba 4.04 percent; Simalungun 4.84 percent; Dairi 5.12 percent; Karo 5.13 percent; Samosir 5.34 percent; and Humbang Hasundutan 5.52 percent, respectively. Compared to the real economic growth of North Sumatera, only Humbang Hasundutan has an equivalent number, while other regencies are below the economic growth of North Sumatera.

From the seven regencies in KDT, there are quite striking disparities in economic growth.

In the long term, the disparity of economic growth is the dominant factor in the migration of economic resources—moving to a regency with high economic growth and leaving a regency with declining or slowing economic growth (Ahmed et al., 2020). Regencies with high growth will experience disturbances in the form of creating ‘new pockets’ of poverty due to migration from regencies with low growth. At the same time, regencies with low economic growth will lose their economic potential (Acemoglu & Robinson, 2012; Todaro & Smith, 2012). In the KDT development process, equal economic growth in each regency that is directly adjacent is necessary to produce convergent economic growth. It will avoid leakages of economic resources from one regency to another and avoid negative externalities in regencies with high economic growth, i.e., the growth of unemployment and new poverty that reduces the value of development achieved (Sipahutar, 2019).

Economic development is a sustainable resource management process. It must be carried out systematically and directed according to the development vision, i.e., achieving regional and national prosperity (Acemoglu & Robinson, 2012; Sipahutar, 2016, 2019; Sipahutar Oktaviani, Siregar, & Juanda, 2017). Thus, sustainable development in KDT is a development principle directed at the convergence of economic growth in the region. It will create balance, economic and political stability, and prevent negative development externalities. In the context of the economic magnitude, although the economic growth of Humbang Hasundutan is the highest in KDT and even equal to the average economic growth of North Sumatera, the average Gross Regional Domestic Product (GRDP) of Humbang Hasundutan is the lowest at Rp 880.4 billion.

Economic development is carried out through the development of economic sectors. These are the real economic activities to encourage economic growth, which in turn, through the growth of a good quality of economic sector, also unemployment and poverty rates can be reduced. Based on the economic sector, each regency in KDT has a similar pattern in development. Agricultural, trade, and construction sectors have a dominant composition in the regional economy. During 2010-2017, the average composition of the agricultural sector in Karo was 56 percent which is the highest composition in KDT, followed by Samosir 51.99 percent, North Tapanuli 48.60 percent, Humbang Hasundutan 47.21 percent, Dairi 46.5 percent, and Toba 34.81 percent. For the trade sector, the average composition in Toba is 15.59 percent which is the highest composition in KDT, followed by Dairi 15.47 percent, Humbang Hasundutan 13.84 percent, North Tapanuli 12.54 percent, Samosir 10.7 percent, and Karo 10.63 percent. Furthermore, for the construction sector, the average composition in Humbang Hasundutan is 13.19 percent, which is the highest composition in KDT, followed by Dairi 12.67 percent, North Tapanuli 12.04 percent, Toba 11.73 percent, Samosir 10.43 percent, and Karo 7.7 percent, respectively.

The similarity of sectoral economic composition in KDT is a strong reason for convergent economic growth in the region (Aghion et al., 2010; Aghion, Howitt, & Mayer-Foulkes, 2005; Barro & Sala-iMartin, 2004). The non-convergence of regional economic growth that occurred during 2010-2017 could have occurred as a result of the unsynchronized linkage in the management of economic resources

between regency in the region or the sectoral ego of development policymakers in each regency which had an impact on sectoral ego at the level of managers or economic agents in each regency (Sipahutar, 2019).

The unsynchronized linkage of the management of economic resources in a region will result in economic disparities between regencies. Furthermore, the disparity that occurs will disrupt the region that experiences high growth. In the end, it will spread to all regencies in KDT and will ultimately create a setback in all aspects of the economy (Angeloni & Faia, 2013; Arestis, Demestriades, & Luintel, 2001; Barro, 1981; Barro & Sala-iMartin, 2004; Beck, Colciago, & Pfajfar, 2014; Levine, Loayza, & Beck, 2000). Sipahutar (2019) stated that each regency cannot partially implement development policies in KDT. It must be directed through policies that are integrated between regencies so that inter-regency linkages are formed between economic sectors. Thus, economic convergence can be achieved by making the tourism sector the ultimate goal. Through this policy, KDT will avoid the negative externalities of development.

The tourism sector has linkages with other economic sectors because it can trigger other economic sectors to increase their production (Antara, 2001). It is very important to pay attention to the inter-relationships between economic sectors in regencies because increasing economic growth in a region is difficult to achieve only by focusing on one economic sector and region only. The seventeen economic sectors that make up the GRDP can positively influence economic growth, both in the agricultural, industrial, and service sectors (Bhegawati, 2017). In the seven regencies in KDT, seen from the composition of GRDP, it shows that the agricultural sector has a large contribution to GRDP, which is more than 40 percent in all regencies and followed by trade sectors with an average of more than 10 percent and the rest is divided into fifteen other sectors.

Economic growth of aggregate demand can be driven through the level of consumption, investment, government spending, and net exports. Meanwhile, from the aggregate supply side, economic growth can be encouraged through increased production in each sector. Thus, we can hypothesize that there is a positive relationship between economic growth and changes in the composition of the economic sector (Tambunan, 2011). The composition of the economic sector that does not only focus on one sector, such as the synergy between agricultural, industrial, and service sectors, will make the regional economy efficient, and economic growth tends to be faster (Sjafrizal, 2008). The study aims to examine the relationship between the composition of the economic sector in the optimal GRDP to stimulate economic growth, reduce unemployment, and poverty in each regency and between regencies.

METHOD

The data involved in this study is secondary data from 2010 to 2019 from Statistics Indonesia. Lake Toba Region (KDT) that being a sample of this research is North Tapanuli, Toba, Simalungun, Dairi, Karo, Humbang Hasundutan, and Samosir Regency. The economic sectors included in the analysis are seventeen economic sectors in the regencies' GRDP. This study investigates the influence of the seventeen economic sectors on economic growth. Several studies have shown that several economic sectors such as agriculture, mining, industry, trade, hospitality, and services significantly affect economic growth (Bhegawati, 2017;

Gunawan & Penangsang, 2017; Lestari, 2016). The agricultural, industrial, and trade sectors have a significant effect on economic growth because these sectors can absorb many laborers, reduce unemployment, increase revenue, and reduce poverty (Antara, 2001; Murohman et al., 2014; Niara & Andria, 2019). The effect of the composition of the economic sector on GRDP is analyzed using a panel data model with the following formulation (see Equation 1).

$$Y_{i(t)} = \beta_1 + \beta_i kSEK_{i(t)} + \epsilon_t \dots\dots\dots (1)$$

Information

- $Y_i(t)$ = real economic growth per capita in i regency in t period;
- $kSEK_i(t)$ = the composition of the GRDP economic sector in i regency in t period;
- β_1 = intercept;
- β_i = independent variable coefficient; and
- ϵ_t = residual.

RESULTS AND DISCUSSION

There are seven regencies in Lake Toba Region (KDT) surrounded by hills and mountains, known as Mount Pusuk Buhit, Sinabung, Sibanyak, Simanuk-manuk, and hundreds of rivers from these seven regencies empties into Lake Toba. Agriculture, mining, energy, and tourism are potential sectors with these geographical conditions. The result of previous research shown that agriculture is a potential sector in North Tapanuli, Humbang Hasundutan, Samosir, Karo, and Dairi, while industrial and energy sectors are potential in Toba (Bangun, 2021; Ginting, 2015; Purba, 2014). Potential economic sectors give a relatively big contribution to the composition of GRDP. It will affect the regencies’ economic growth in KDT.

Figure 1 shows the real economic growth conditions in KDT regencies from 2010 to 2019. If compared with the economic growth of North Sumatera as 5.63 percent, in general, those regencies have lower economic growth. There are six regencies that have lower economic growth, i.e., North Tapanuli, Toba, Simalungun, Dairi, Karo, and Humbang Hasundutan. Only Samosir has a higher economic growth of 5.77 percent. The economic structure of Samosir is not much different from the other six regencies. Samosir has an economic base—the agricultural and services sector (Gultom & Hendarto, 2014).

Samosir, which was the result of the division of Toba Samosir Regency in 2003, had an average contribution of the agricultural sector in real GDP of 51.79 percent during 2010-2019 (Table 1). Compared to the composition of real GRDP in other regencies—mining, accommodation, and government sectors—have a larger contribution than other regencies as 0.62 percent, 4.92 percent, and 11.73 percent, respectively. The accommodation sector is related to the tourism sector because Samosir has several tourist objects that local and foreign tourists can visit. Investment in the tourism sector will indirectly affect the accommodation sector because investment in the tourism sector can increase tourist visits (Risso, 2018). Toba, which is the parent regency of Samosir, has the smallest contribution of the agricultural sector in real GDP compared to other regencies, which is 34.04 percent.

However, several economic sectors have a greater contribution than other regencies, i.e., industrial, trade, information, services, and education.

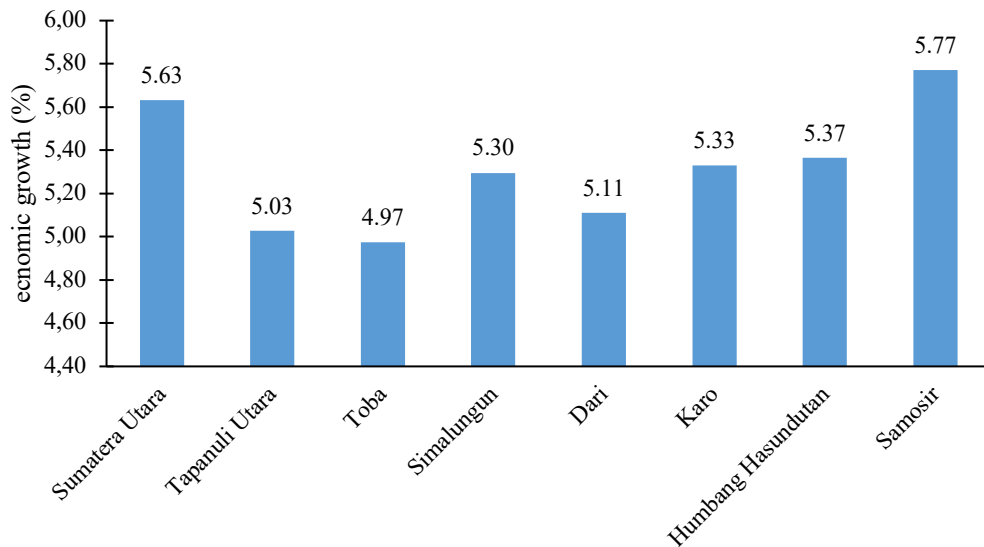


Figure 1. Average Economic Growth in 2010-2019 (%)

The largest contribution of the agricultural sector to real GDP in Karo is 56.70 percent. Real estate, health, and other service sectors also contribute to Karo's real GRDP compared to other regencies, at 3.08 percent, 1.11 percent, and 1.15 percent, respectively. Humbang Hasundutan only has the construction sector as the largest contribution to real GRDP compared to other regencies. The mining sector has a contribution of 13.49 percent, while in other regencies, it is around 7.02 to 12.90 percent. Similar to Humbang Hasundutan, Dairi also has only one sector with the largest contribution to real GDP—the financial sector. The contribution of this sector is 2.12 percent if compared to other regencies, and it is around 0.92 to 2.74 percent only.

Energy, water, and transportation sectors are the dominant sectors in North Tapanuli compared to other regencies. The energy sector has a contribution of 0.09 percent, while in other regencies is around 0.06-0.08 percent. The water sector has a contribution of 0.11 percent, while in other regencies is around 0.05-0.08 percent. The transportation sector in North Tapanuli has a contribution of 4.68 percent, whilst in other regencies is only around 1.55-4.48 percent.

Simalungun is the only regency that does not have an economic sector whose contribution is higher than other regencies. It means that the contribution of all economic sectors in real GDP is under other regencies. However, if compared to all economic sectors in Simalungun, there are three sectors with dominant contributions, i.e., agricultural, industrial, and trade sectors as 53.23 percent, 11.92 percent, and 14.54 percent, respectively.

Super priority tourism destination created by the Government for several tourist attractions, such as Borobudur in Central Java, Mandalika in West Nusa Tenggara, Labuan Bajo in East Nusa Tenggara, Likupang in North Sulawesi, and Lake Toba (KDT) in North Sumatra. The government prepares infrastructure development for strategic tourism areas through (1) preparing readiness criteria for tourism infrastructure investment, (2) providing sustainable financial schemes for tourism investment, (3) financing physical development such as clean water and

sanitation, roads, electricity, drainage, solid waste, smart platforms, museums, green open spaces, and landscapes, (4) encouraging the business field and community, State-owned Enterprises, and Regional-owned Enterprises (PUPR, 2019). In the KDT area, there are seven regencies that have their potential economic sectors that can be developed to support the Super Priority Program.

Table 1. Composition of Real GRDP of Regencies in KDT 2010-2019 (%)

Economic Sectors	Regencies						
	North Tapanuli	Toba	Simalungun	Dairi	Karo	Humbang Hasundutan	Samosir
Agriculture	47.64	34.04	53.23	45.58	56.70	46.47	51.79
Mining	0.07	0.29	0.23	0.07	0.24	0.59	0.62
Manufacturing	1.91	12.18	11.92	0.35	3.34	1.60	0.57
Electricity & Gas	0.09	0.06	0.07	0.08	0.07	0.07	0.06
Water Supply	0.11	0.05	0.08	0.08	0.08	0.07	0.05
Construction	12.48	12.14	9.00	12.90	7.02	13.49	10.55
Wholesale	13.13	16.03	14.54	15.95	10.01	14.14	10.93
Transportation	4.68	2.96	1.55	3.78	4.48	2.40	3.29
Accommodation	2.41	2.83	0.93	2.88	2.44	3.18	4.92
Information	0.88	1.06	0.60	1.00	0.79	0.91	0.80
Finance	1.60	1.53	1.03	2.12	1.31	1.19	0.92
Real Estate	2.34	2.75	0.89	2.74	3.08	2.69	2.13
Business	0.29	0.84	0.09	0.06	0.20	0.13	0.12
Public	9.85	9.76	4.36	9.89	5.70	11.34	11.73
Education	1.86	2.49	1.02	1.87	2.30	0.98	0.90
Human Health	0.79	0.83	0.36	0.64	1.11	0.62	0.56
Other Services	0.13	0.15	0.10	0.02	1.15	0.14	0.08

There are 17 economic sectors being analyzed for effect on economic growth in KDT. Based on the results of the panel data estimation in the model with a total of 70 observations during the 2010 to 2019 observation period, it can be seen in Table 1. This estimation provides empirical support for the relationship between economic growth and the composition of the economic sector in regencies' GRDP in KDT. Table 1 is the estimation result with dependent variable of real economic growth and independent variable include the contribution of agricultural in GDP (lnX1), mining (lnX2), industrial (lnX3), energy (lnX4), water (lnX5), construction (lnX6), trade (lnX7), transportation (lnX8), accommodation (lnX9), information (lnX10), finance (lnX11), real estate (lnX12), service (lnX13), government (lnX14), education (lnX15), health (lnX16), and other service sectors (lnX17).

Estimation model carried out by including all economic sectors in GRDP. The result shows that several economic sectors show a positive and significant influence on real economic growth. Economic sectors show a positive and significant influence on real economic growth. Economic sectors that have a positive and significant impact on economic growth are mining, energy, information, finance, and health sectors. Besides, several economic sectors have no significant effect on the economic growth of KDT (Table 2). However, several sectors that have no significant effect have large contributions to regencies' GRDP in KDT relatively, such as agriculture, industry, construction, and trade sectors.

The average contribution of several sectors to regencies' GRDP is as follows: agricultural 47.92 percent; industrial 4.55 percent; construction 11.08 percent; and trade 13.53 percent, respectively. These sectors have no significant effect on economic growth. In regional economic development theory, inter-sector linkages are an important element in economic development. Although agricultural, industrial, construction, and trade sectors have no significant effect, they have forward and backward linkage. These two linkages will support regional economic growth faster.

Several studies show the interrelationships between the economic sectors above. The industrial sector has forward linkages to the agricultural sector, while energy and construction have backward linkages to the agricultural sector (Adnyana, 2010; Widyawati, 2017). Therefore, the development of the industrial sector must start from the processing of agricultural products through the development of the agro-industry. Furthermore, the increase in the industrial sector will encourage the development of energy, trade, accommodation, communication, and services sectors (Sjafrizal, 2008).

The government needs to encourage revenue in these economic sectors that have no significant effect on economic growth by increasing production and investment so that the magnitude can be increased. Saragih (2015) stated that strategies that can be carried out by the government in regional economic development are (1) improving competitiveness, (2) stimulating investment inflows, (3) improving workforce skills, and (4) improving infrastructure.

Mining, energy, information, finance, and health sectors have a significant and positive effect on regional economic growth in KDT. Efforts that can be made by the government are to encourage investment in the four sectors because it is able to stimulate regional economic growth (Talpur, 2019; Yuliana, Bashir, & Rohima, 2019). The mining sector shows a positive and significant effect. It means that an increase revenue by one percent will increase real economic growth by 1.416 percent. Based on the result of several research, the mining sector has a major contribution to regional economic development (Mercy, 2017; Olalekan, Afees, & Ayodele, 2016). KDT that become one of the super priority programs is a part of the overall economic development of the region. As Djoko Hartayo said, the development of this program requires harmonization between sectors through coordination between ministries and government parties (PUPR, 2020). Harmonization between agriculture, industry, and services will be very helpful in encouraging economic growth faster in KDT.

The modern theory group views that technological change is also considered as one of the factors of production that influence economic growth (Tambunan, 2001). The information and communication sector development in GRDP is related to the availability and advancement of technology in the region. It can be concluded that technological change will encourage the development of this sector and increase economic growth. The result of the analysis shows that the information and communication sector have a positive and significant impact on economic growth in KDT (Table 2). Wardhana et al. (2020) conducted a study of the influence of information and communication technology on economic growth. The results showed that this sector had a significant effect on regional economic growth. Although this sector has a significant influence, the use of information technology is still lacking, so it has not contributed much to GDP (Prihawantoro, Tukiyyat, &

Nuraini, 2019). This is also evident from the information and communication sector in KDT, which shows that its contribution is still low, with an average of 0.0071 and 0.86 percent in seven KDT regencies.

Table 2. Estimated Result of the Effect of GRDP Sector Composition on Economic Growth in Lake Toba Region (KDT)

Independent Variable	Value			
	Coeff.	SE	t-stat	Prob
C	20.67503	9.778465	2.114342	0.0399
Agriculture	-2.586668	1.557986	-1.660264	0.1037
Mining	1.416349***	0.313214	4.521991	0.0000
Manufacturing	-0.292385	0.196249	-1.489866	0.1431
Electricity & Gas	0.481786*	0.269073	1.790539	0.0799
Water Supply	0.207584	0.291180	0.712906	0.4795
Construction	-1.208497	0.468038	-2.582051	0.0131
Wholesale	0.274745	0.682213	0.402726	0.6890
Transportation	-0.148327	0.412350	-0.359712	0.7207
Accommodation	-0.189471	0.469053	-0.403944	0.6881
Information	0.814213*	0.404080	2.014980	0.0498
Finance	0.779762**	0.278085	2.804039	0.0074
Real Estate	-0.619473	0.401397	-1.543293	0.1296
Business	-0.338334	0.409280	-0.826656	0.4127
Public	-1.189214	0.557666	-2.132485	0.0383
Education	-0.619889	0.402918	-1.538499	0.1308
Human Health	1.103450***	0.308693	3.574593	0.0008
Other Services	-0.337060	0.298480	-1.129256	0.2646
Value				
R2	0.794834			
Adj R	0.692251			
F-Statistic	7.748189			
Prob F-stat	0.000000			
Durbin-Watson	2.534524			

Note(s): *** = significant 1%, ** = significant 5%, * = significant 10%

The energy sector has a significant effect on economic growth in KDT, but its contribution to GRDP is relatively small, around 0.06 – 0.09 percent (see Table 1). The government needs to comprehensively explore additional locations to provide facilities and infrastructure such as roads and sea transportation to comprehensively explore locations for additional energy production (Nazir et al., 2020). Research that has been conducted has shown that the income of the energy sector in the form of energy consumption (electricity, water, and gas) has a significant effect on economic growth (Azam, Khan, & Ozturk, 2019; Azam, 2019). It is necessary for the government to make policies that encourage investment in the energy sector and use energy effectively.

Society behavior and environmental cleanliness are closely related. Public health is notably dependent on environmental cleanliness and health. Also, environmental hygiene is very dependent on society's behavior. It will have an impact on economic activities in environmental exploitation in a sustainable manner—analysis result of health sector shown a positive effect on the economic growth of KDT. Therefore, the activities to maintain cleanliness and environmental

health in KDT really need to be done. Based on the results of laboratory tests on the water quality of Lake Toba, it indicates that Lake Toba can still be used for profitable economic activities such as freshwater fish farming, animal husbandry, and crop irrigation (Ekawati et al., 2016). A clean environment will ensure public health, be economically beneficial, and increase revenue. Government spending on the health sector in KDT needs to be increased because the higher government spending on the health sector, the lower the poverty rate will be (Palenewen, Walewangko, & Sumual, 2018). The poverty rate will affect economic growth. The lower the poverty rate, the higher economic growth will increase (Novriansyah, 2018).

The role of financial services sector plays an important role in regional economic development. Financial services such as banking can provide loan capital such as for Micro, Small, and Medium Enterprises (MSMEs) engaged in various sectors. Based on the results of research conducted by Antara (2001), it remarks that MSMEs have a strategic role as a trigger for economic growth. The role of financial services in KDT should be able to take an important part in supporting MSME businesses. Based on the analysis result shown in Table 2, the financial sector has a significant effect on KDT's economic growth. Today, the financial services sector has a positive effect on economic growth in the short term. They are related to financial activities such as banking, insurance, and other financial services (Bucci & Marsiglio, 2019).

The role of financial services in KDT can be seen in the number of loans granted. Based on Regional Financial Economic Statistics published by Bank Indonesia in several years, the trend of total loans (working capital, investment, and consumption) from 2010 to 2020 in seven regencies in KDT shows an increasing trend. In 2010, the total loan was only Rp 4,146,437 million, but in 2020, it was Rp 16,551,297 million. Of the three types—working capital loans, investment, and consumption, the largest portion is working capital loans. The average portion of it was 44 percent during 2010-2020, while investment and consumption loans averaged 21.40 and 34.61 percent, respectively.

CONCLUSION

The composition of the GRDP sector has an important role in real economic growth. Mining, energy, information, finance, and the health sector have a positive and significant impact on real economic growth. The increase in revenue from the mining sector through the exploration of new mine sites will increase economic growth. The energy sector, such as the provision of electricity and gas that is easily accessible to society, will increase the revenue of this sector. The availability of internet networks does not directly contribute to economic development, but an increase in revenue from the informal sector can be obtained by increasing society access and user skills in accessing information sources. The financial and health sector is a service business that can increase economic growth by improving the quality of services to society.

Efficient economic growth in KDT can be achieved by increasing the revenue of each economic sector through increased production, investment, and inter-sector linkages so that the government needs to carry out several policies, such as (1) directing policies to increase revenue in mining, energy, information, and health economic sectors and (2) encourage economic sectors that contribute greatly

to GRDP through investment, deregulation, input subsidies, and incentives. The existence of this policy is expected to accelerate economic growth in KDT.

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