Analysis of the Influence of Development Inequality and Human Development Index (HDI) on North Sumatra Economic Growth 2015 - 2020

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Abstract: North Sumatra is a province that consists of 33 districts/towns and has special conditions within the distribution of natural resources and human resources in every district/town. So, there are issues including the inability to manipulate development Inequality and the Human Development Index. The purpose of this study is to decide the impact of regional development inequality and HDI on economic growth in North Sumatra in the 2015-2020 period. the usage of the kind of secondary facts observation with an aggregate of panel records sourced from the legitimate internet site of BPS North Sumatra. With panel data regression analysis and processed the usage of the E-views 10 software. The outcomes of the study provide an explanation for that local development inequality and the human development index have a partial and widespread fantastic influence. The results of the determination test provide an explanation for that regional development inequality and HDI variables have an impact of 91.41% on economic growth.

Keywords: Regional Development Inequality, Human Development Index, Economic Growth.

1 Introduction

Economic growth is the development of a area or United States which may be considered with numbers in a presentation that illustrates the level of economic growth in a rustic at one time as compared to the previous time. Measuring the system of the velocity of economic growth, particularly the usage of GRDP. the supply of factors of production in a rustic is used in determining economic growth. based totally at the micro idea in manufacturing theory, an increase in the quantity of output is decided by the inputs involved inside the system of economic growth. that is due to the fact the factors of production encompass natural sources, capital goods, exertions, and knowledge. at the regional degree, GRDP is used as an output degree of the increase within the boom in elements of manufacturing. GRDP is the full growth of all production activities in the regional financial system that's calculated on the premise of the concept of the drift of goods. GRDP is calculated using the cost of the product created in a certain duration.

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[5], (Umiyati Ethics, 2014) . To find out real economic growth from year to year, the economic growth of a region may be visible through regular fee GRDP due to the fact steady fee GRDP describes the improvement of goods and services as measured via expenses prevailing in a particular year as a base year and is not stimulated by using price factors.

In line with information from BPS North Sumatra, extended economic development in North Sumatra Province has in reality supplied economic and social improvement for the community, if economic growth improves, the income degree of the network will even grow so that you can meet the wishes of human beings's lives which illustrates the welfare of the regional network in North Sumatra. [16], Sjafrizal (2008) explains that regional growth is able to reflect the success of development in a location, if the location can offer an increase inside the fee of economic growth, then the area is said to have been capable of performing maximum development.

The achievement of the development that has taken region in North Sumatra become able to push the previous GRDP in 2005, which amounted to 139,618.three billion rupiahs, to 440,955.85 billion rupiahs in 2015. according to table 2 economic growth is calculated the use of the boom in ADHK GRDP for the length 2010 in North Sumatra Province, specifically in 2018 it grew 4.2%, namely 512,762 billion rupiahs, which has a tendency to growth extra in comparison to 2017 growth which elevated through 5.9%, specifically 491,922 billion rupiahs.

North Sumatra is a province that includes 33 regencies and towns and has distinctive situations among areas whose distribution is exceptional in every Regency/city, namely because it lies in variations in social and monetary characteristics and even herbal resources. The end result is the trouble of financial improvement, specifically the inability to govern human assets and natural sources. ability and more prosperous regions may be seen as comparative advantages inside the region, however alternatively, there are several financial problems, together with human resources and capital assets which are often faced through low-stage selection-makers at the provincial or district and city levels. The effect is that monetary conditions in earnings distribution are not met, and still describe disparities inclusive of inequality in economic fulfillment among districts/towns [21], (Yusuf, 2013).

Improvement in inequality in North Sumatra Province throughout the 2015-2019 duration confirmed an growth. the IW price in 2015 was recorded at simplest 0.55 which changed into smaller than in 2019 where the inequality fee reached 0.57. The local development hole in North Sumatra Province is still in the excessive hole due to the fact the Williamson Index fee in North Sumatra Province is still above 0.5. If the condition of this disparity is pretty anxious, this is, while the index price gets towards 1, this may illustrate the widening cost of inequality and might have an impact on nearby economic growth.

[6], Gabriel et al. (2021) of their studies display that economic growth has a high quality impact on the improvement Inequality. this is because economic growth is greater dominant in developed areas than in developing areas. Then, it may produce and boom improvement disparities between regions. variations in demographic situations and human resources in a place can also have an effect on the exceptional of human sources, that is generally calculated with the aid of HDI. the extent of population productivity is motivated with the aid of the rise or fall of HDI and is capable of have an impact on human beings's profits.

From 2015 to 2020 the HDI price in North Sumatra has accelerated, but in truth, several regions in North Sumatra nonetheless have a low Human Development Index or even the index cost is a long way under the index price in different regions in North Sumatra Province. [15], Robert M. Solow (1956) defined his concept that an economic boom comes from a few additives of elevated excellent and amount of humans including life expectancy which has the capacity to increase the group of workers. If economic growth is followed by human improvement, then economic growth can also be observed via a good distribution of development. this will then have an effect on all residents being able to enjoy the blessings of development and could affect the distribution of earnings.

The research studied by [8], Hidayat & Paidi (2015), states that the HDI has a high quality impact on the monetary boom because the lower the HDI, it's going to reduce the level of populace viability to be able to further reduce production and profits, and vice versa, namely when the HDI fee increases, will growth the hobby of the populace that's able to increase income. whilst as compared with the average economic growth in other areas in Indonesia, North Sumatra Province in 2015-2020 has economic growth that can be stated to be quite desirable. but, the benefits of human capital or HDI and high economic interest in a place will permit the emergence of uneven development troubles. North Sumatra has troubles which might be based on different in step with capita GRDP troubles which illustrate the incidence of profit inequality among regions in North Sumatra.

According to the reason above, there are still disparities in nearby improvement and HDI high-quality levels in each location which are triggers for fairness that has not been maximized in nearby monetary growth in North Sumatra Province. So, primarily based at the above phenomenon, researchers are endorsed to carry out medical research entitled analysis of the impact of local improvement Inequality and HDI on economic growth in North Sumatra to research how some distance has an effect on of regional improvement inequality and HDI on economic growth in North Sumatra in 2015-2020.

2 Method

2.1 Data Types and Sources

This study uses a type of secondary data observation with a combination of panel data. Data sourced from the official website of BPS North Sumatra. With panel data regression analysis and processed using the E-views 10 program. Sourced from field observations and through the library (library research) which will then be processed again by researchers through second-party processing results, the type of data obtained is quantitative research in the form of secondary data. Panel data is the type of data used in this study, where the data is a combination of cross-section data and time series data and is sourced from the official website of the North Sumatra BPS (Central Bureau of Statistics), namely https://sumut.bps.go

2.2 Data analysis method

2.2.1 Inequality index

Is a Regional Inequality or referred to as the regional inequality index, which uses the

following formula :

$$IW = \frac{\sqrt{\sum(Y1-Y)2\frac{Fi}{n}}}{Y} \quad (1)$$

Information :
Y1 = GRDP per capita of districts/cities in North Sumatra
Y = GRDP per capita in North Sumatra
Fi = Total Population of Districts/Cities in North Sumatra
n = Total population in North Sumatra

2.2.2 Panel data regression analysis

The regression estimation model used is:

$$GRDP\ SU = \alpha 0 + \alpha_1 Iwi + \alpha_2 IPMi + eit \quad (2)$$

Where :

GRDPSU = HK North Sumatra Gross Regional Domestic Product

$\alpha 0$ = Constant

α_1, α_2 = regression coefficient (parameters)

IW = Regional Development Inequality

HDI = Human Development Index t = Year (2015-2020 time series data)

Panel data uses regression models, including the following:

1. Pooled Least Square / CEM (Common Effect Model)

The PLS (Pooled Least Square) / CEM approach uses data estimation using the OLS (Ordinary Least Square) method. The regression form of this CEM is:

$$Yit = \beta 1 + \beta 2 + \beta 3X3it + \ldots + \beta nXnit + uit \quad (3)$$

2. Fixed Effects Model (FEM)

The fixed Effect Model approach requires a dummy variable to display the intercept between time series and cross sections , so this approach can also be called the Least Square Dummy Variable (LSDV). Regression forms of this approach are:

$$Yit = \alpha 1 + \alpha 2D2 + \ldots + \alpha nDn + \beta 2X2it + \ldots + \beta nXnit + uit \quad (4)$$

3. Random Effect Model (REM)

error calculations with the Generalized Least Square (GLS) method is called the Random Effects Model approach. Regression forms of this approach are:

$$Yit = \beta 1 + \beta 2X2it + \ldots + \beta 2X2it + \varepsilon it + uit \quad (5)$$

Information :

Yit = dependent variable for the-i individual and the t-time

Xit = independent variable for the-i individual and the t-time

Dit and Xit = dummy variables

β = Error cross-section component

εit = Component error time series

uit = Compound error component

In estimating panel data, several methods are used, namely:

1. Chow test

The Chow Test is an F Statistical Test. This test is carried out to determine the model to be used, namely between FEM or CEM. It is assumed that there is a tendency to have different and unrealistic behavior in each cross-section. With several hypotheses, including:

$$H0 = CEM (> \alpha = 0.05) \quad (6)$$

$$H1 = FEM (< \alpha = 0.05) \quad (7)$$

If H0 is accepted, then CEM is the model used. Conversely, H0 is rejected, so FEM is a suitable model. However, another Hausman test is needed to further determine whether FEM is a suitable model.

2. Hausman test

To determine the model to be used between FEM or REM the Hausman Test is used. In the Hausman Test the hypothesis is used, namely:

$$H0 = (< \alpha = 0.05) \quad (7)$$

$$H1 = (> \alpha = 0.05) \quad (6)$$

With the criteria H0 being accepted, REM is the model used. Conversely, H0 is rejected, so FEM is a suitable model.

2.2.3 Classic assumption test

In the OLS-based regression analysis, namely CEM and FEM, the classical assumption test was carried out. So the regression analysis using the GLS, namely REM, the classical assumption test is not needed. The classical assumption test that is applied is:

1) Normality Test is a test conducted with the aim of showing whether the residuals are not normally distributed or normal.
2) Heteroscedasticity Test This test was carried out with the aim of testing the variance of the residuals from one observation to another.

3) Multicollinearity Test To see whether there is a multicollinearity problem caused by a perfect linear relationship between all independent variables or several independent variables.

2.2.4 Hypothesis testing

1. t-test (partial test) The partial test or t-test aims to determine whether the regression coefficient has a significant effect or not on each independent variable. The independent variable partially has a significant influence on the dependent variable if the probability value < α = 5% (0.05) and vice versa.
2. Statistical F Test (Simultaneous Test) Statistical F test in this study the significant level used was 5% and aims to determine the variables of Regional Development Inequality and HDI or Human Development Index in a way that simultaneously or simultaneously has an influence on the variable Economic Growth in Sumatra Province North.
3. R-squared Coefficient Test of Determination (R^2) The coefficient of determination test (R^2) aims to measure the suitability of the model if $R^2 = 1$, how much influence all the independent variables have on the dependent variable is also shown by R^2. The coefficient of partial determination (R^2) can also tell which show how much the ability of each independent variable influences the dependent variable

2.2.5 Operational definition

1. Economic growth is the real growth rate every time in an area and the GRDP ADHK growth rate is used as a standard and is expressed in units of billions of rupiah
2. Regional development inequality is the development gap between regions as measured by the Williamson Index, which uses GRDP per capita on the base of constant prices and population, with the following criteria.

   a. If the IW value is > 0.35 then lameness is high

   b. If the value of IW = 0.21 – 0.35 lame is moderate

   c. If the value of IW < 0.20 lame is low
3. HDI is a human development that has a measure of achievement and is guided by a few basic components of quality of life there are 4 basic components that are calculated, namely the expected length of schooling and the average length of schooling for education, life expectancy for the health sector, people's purchasing power for per capita spending. BPS (2015) suggests that there are four groups of HDI achievement categories between regions, namely:

   a. Low HDI, if HDI <60

b. Lower middle HDI, if 60 ≤ HDI

c. Upper middle HDI, if 70 ≤ HDI <80

d. High HDI, if HDI ≥ 80

3 Result and discussion

3.1 Overview of North Sumatra province

North Sumatra Province is a place located at the lines 1–4° North range and 98° – 100° East Longitude, which is within the western a part of Indonesia. adjacent to Aceh, specifically at the northern border, adjacent to the provinces of Riau and West Sumatra at the southern border, adjoining to the kingdom of Malaysia inside the eastern part of the Malacca Strait, and bordering the Indian Ocean within the west. 72,981 km² constitutes the land vicinity of the province of North Sumatra, the maximum of which is at the mainland of the island of Sumatra and is positioned at the islands of Batu, Nias Island, and nearby small islands, each on the coast of the eastern part of Sumatra Island and a small part of the western part.

North Sumatra is a province that belongs to an area that has tropical weather that is stimulated through the presence of Monsoon winds and Passat winds. in order that the common humidity in North Sumatra is around 78% -91% with 43% daylight. The mainland of the province of North Sumatra has a very varied surface elevation, that's flat in maximum regions, only some meters above sea level, has a weather that could reach 33° C that is pretty warm, and in some areas, it's far hilly with a mild slope, has a slight weather., can reach 22° C minimal temperature in elements which can be at excessive altitudes.

3.1.1 Area, population, and population density by District/city in North Sumatra Province

The province that has the fourth (4) largest population in Indonesia, namely after the provinces of West Java, East Java, and Central Java, is the province of North Sumatra. North Sumatra is also a province that has the largest total population on the island of Sumatra. From 2015 to 2019 the population in North Sumatra Province did not experience very large fluctuations. Seen in the following table:

Table 1. Area, Total Population, and Population Density by District/City in North Sumatra Province in 2019.

District/City	Area (Km2)	Total Population	Population Density
Nias	1842.51	143319	77.78
MandailingNatal	6134.00	447287	72.92
TapanuliSelatan	6030.47	281931	46.75
TapanuliTengah	2188.00	376667	172.15
TapanuliUtara	3791.64	301789	79.59

TobaSamosir	2328.89	183712	78.88
LabuhanBatu	2156.02	494178	229.21
Asahan	3702.21	729795	197.12
Simalungun	4369.00	867922	198.65
Dairi	1927.80	284304	147.48
Karo	2127.00	415878	195.52
DeliSerdang	2241.68	2195709	979.49
Langkat	6262.00	1041775	166.36
NiasSelatan	1825.20	319902	175.27
HumbangHasundutan	2335.33	190186	81.44
PakpakBharat	1218.30	48935	40.17
Samosir	2069.05	126188	60.99
SerdangBedagai	1900.22	616396	324.38
BatuBara	922.20	416493	451.63
PadangLawasUtara	3918.05	272713	69.60
PadangLawas	3892.74	281239	72.25
LabuhanbatuSelatan	3596.00	338982	94.27
LabuanbatuUtara	3570.98	363816	101.88
NiasUtara	1202.78	137967	114.71
NiasBarat	473.73	82154	173.42
Sibolga	41.31	87626	2121.18
Tanjungbalai	107.83	175223	1624.99
Pematangsiantar	55.66	255317	4587.08
TebingTinggi	31.00	164402	5303.29
Medan	265.00	2279894	8603.37
Binjai	59.19	276597	4673.04
Padangsidimpuan	114.66	221827	1934.65
Gunungsitoli	280.78	142426	507.25
North Sumatra	**72981.23**	**14562549**	**199.54**

3.1.2 North Sumatra Province Economic Growth

According to the District/City in 2015-2020, the Economic Growth of North Sumatra Province can be seen in Table 2 below.

Table 2. North Sumatra Province economic growth by District/City in 2015 – 2020

District/City	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
North Sumatra	**440,956**	**467,188**	**491,923**	**512,763**	**539,514**	**533,746**
Nias	2,100.11	2,214.15	2,325.01	2,440.16	2,563.03	2,609.14
Mandailing Natal	7,474.42	7,933.13	8,416.50	8,904.14	9,376.46	9,288.65
Tapanuli Selatan	7,921.24	8,314.69	8,748.18	9,201.96	9,683.66	9,721.77
Tapanuli Tengah	5,738.32	6,032.21	6,348.44	6,678.25	7,024.15	6,970.58
Tapanuli Utara	4,868.95	5,070.19	5,280.69	5,510.19	5,764.94	5,851.40
Toba Samosir	4,553.17	4,767.98	5,001.43	5,249.25	5,503.76	5,488.92
Labuhan Batu	19,079.93	20,046.02	21,048.17	22,112.34	23,232.71	23,252.75
Asahan	21,118.75	22,302.70	23,525.35	24,844.87	26,245.24	26,299.57
Simalungun	22,305.43	23,508.97	24,715.67	25,996.21	27,348.70	27,625.70
Dairi	5,413.75	5,688.45	5,968.81	6,267.82	6,569.81	6,508.05
Karo	11,880.93	12,494.87	13,145.85	13,744.17	14,376.28	14,261.47
Deli Serdang	58,722.46	61,839.67	64,991.87	68,341.00	71,878.69	70,596.83
Langkat	24,321.61	25,533.81	26,822.60	28,170.08	29,597.77	29,343.26
Nias Selatan	3,506.03	3,659.77	3,826.62	4,018.74	4,221.04	4,246.83
H. Hasundutan	3,419.57	3,577.05	3,756.66	3,946.12	4,141.10	4,135.60
Pakpak Bharat	677.18	717.89	760.55	805.01	852.30	850.79
Samosir	2,503.73	2,635.77	2,776.85	2,931.70	3,098.74	3,080.43
Serdang Bedagai	15,841.75	16,656.17	17,516.43	18,421.38	19,393.39	19,308.46
Batu Bara	20,259.69	21,165.04	22,034.26	22,998.60	23,998.59	23,923.64
PadangLawas Ut.	6,598.30	6,991.66	7,378.98	7,791.05	8,228.45	8,322.51
PadangLawas	6,341.53	6,725.98	7,110.25	7,534.30	7,959.31	8,053.50
Labuhanbatu Sel.	15,294.17	16,088.42	16,907.59	17,797.95	18,750.16	18,899.31

Labuanbatu Ut.	14,109.37	14,843.99	15,602.05	16,413.33	17,259.19	17,306.59
Nias Utara	1,948.00	2,043.91	2,134.49	2,228.75	2,332.44	2,369.36
Nias Barat	1,017.80	1,074.48	1,126.19	1,179.91	1,236.73	1,257.28
Sibolga	2,914.51	3,063.07	3,224.58	3,393.91	3,570.33	3,521.72
Tanjungbalai	4,637.50	4,904.54	5,174.85	5,473.63	5,790.37	5,763.21
Pematangsiantar	7,992.32	8,380.77	8,750.15	9,170.19	9,611.74	9,430.04
Tebing Tinggi	3,234.05	3,400.75	3,575.51	3,760.50	3,954.03	3,926.39
Medan	124,277.4	132,062.8	139,739.3	148,007.1	156,780.5	153,669.8
Binjai	6,571.20	6,935.55	7,309.57	7,708.59	8,133.54	7,984.46
Padangsidimpuan	3,451.08	3,636.87	3,830.32	4,038.93	4,261.32	4,230.41
Gunungsitoli	2,703.50	2,876.34	3,049.12	3,232.97	3,428.45	3,441.65

Worthwhile growth of North Sumatra Province, which became was467.188 billion rupiah. also, it also extended by using 5.18% worthwhile growth in North Sumatra Province in 2018, videlicet512.763 billion rupiahs. In 2019- 2020 the profitable growth of North Sumatra Province dropped from 539.514 billion rupiahs to 533.746 billion rupiahs which confirmed a drop in the GRDP increase price of -1.07%.

Inside the facts, the steady rate GRDP in Medan metropolis has the largest GRDP statistics in North Sumatra Province, videlicet 153,669.83 billion rupiahs in 2020, observed by using DeliSerdang Regency, that's 70,596.83 billion rupiahs. PDRB consistent price with the smallest quantum, videlicet in Pakpak Bharat Regency amounting to 850.79 billion rupiahs. nevertheless, the rate of profitable growth in 2020 will decline appreciably. The loftiest rate of worthwhile increase in North Sumatra changed in Nias metropolis, which simplest extended by 1.8% and the smallest became in Medan metropolis, which dropped appreciably to 1.98%.

3.1.3 Inequality of Economic Development

Regional Development Inequalities in North Sumatra 2015-2020 using the Williamson Index analysis can be seen in the following table.

Table 3. Williamson Index Between District/Cities of North Sumatra 2015-2020

District/City	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**R**	**Criteria**
Nias	0.041	0.041	0.040	0.042	0.041	0.040	0.041	Low
Mandailing Natal	0.059	0.058	0.056	0.056	0.055	0.056	0.057	Low
Tapanuli Selatan	0.015	0.015	0.016	0.016	0.017	0.019	0.016	Low

Tapanuli Tengah	0.059	0.060	0.061	0.062	0.063	0.064	0.062	Low
Tapanuli Utara	0.053	0.053	0.054	0.054	0.054	0.052	0.053	Low
Toba Samosir	0.003	0.003	0.003	0.002	0.002	0.002	0.003	Low
Labuhan Batu	0.106	0.104	0.102	0.100	0.099	0.098	0.102	Low
Asahan	0.033	0.035	0.036	0.037	0.039	0.041	0.037	Low
Simalungun	0.002	0.004	0.005	0.006	0.007	0.012	0.006	Low
Dairi	0.036	0.036	0.035	0.035	0.034	0.034	0.035	Low
Karo	0.028	0.027	0.026	0.024	0.022	0.020	0.025	Low
Deli Serdang	0.042	0.038	0.034	0.031	0.027	0.017	0.032	Low
Langkat	0.021	0.021	0.020	0.020	0.019	0.020	0.020	Low
Nias Selatan	0.084	0.084	0.084	0.084	0.084	0.084	0.084	Low
H. Hasundutan	0.033	0.033	0.033	0.033	0.033	0.033	0.033	Low
Pakpak Bharat	0.025	0.025	0.025	0.025	0.025	0.025	0.025	Low
Samosir	0.021	0.021	0.020	0.019	0.018	0.018	0.020	Low
Serdang Bedagai	0.000	0.001	0.003	0.004	0.006	0.007	0.004	Low
Batu Bara	0.159	0.157	0.154	0.152	0.149	0.149	0.153	Low
Padang Lawas Ut.	0.000	0.000	0.001	0.001	0.002	0.001	0.001	Low
Padang Lawas	0.008	0.008	0.009	0.010	0.011	0.010	0.009	Low
Labuhanbatu Sel.	0.131	0.128	0.126	0.125	0.123	0.124	0.126	Low
Labuanbatu Ut.	0.086	0.086	0.086	0.087	0.087	0.088	0.087	Low
Nias Utara	0.043	0.043	0.043	0.044	0.044	0.042	0.043	Low
Nias Barat	0.041	0.041	0.040	0.038	0.038	0.037	0.039	Low
Sibolga	0.023	0.024	0.024	0.025	0.026	0.025	0.025	Low
Tanjungbalai	0.007	0.008	0.008	0.008	0.009	0.008	0.008	Low
Pematangsiantar	0.032	0.032	0.031	0.031	0.030	0.028	0.031	Low
Tebing Tinggi	0.022	0.022	0.022	0.023	0.023	0.023	0.023	Low
Medan	0.461	0.472	0.478	0.485	0.493	0.479	0.478	High
Binjai	0.007	0.006	0.006	0.006	0.005	0.008	0.006	Low
Padangsidimpuan	0.045	0.045	0.046	0.046	0.046	0.047	0.046	Low

Gunungsitoli	0.023	0.023	0.022	0.022	0.021	0.021	0.022	Low
North Sumatra	**0.555**	**0.562**	**0.566**	**0.570**	**0.576**	**0.564**	**0.566**	**High**

Table 3 above is the result of calculating the Williamson index (IW) value for each district and city in North Sumatra. In 2015 the IW value in North Sumatra was 0.555 with the criteria of 0.555 > 0.35 meaning that inequality in economic development with high criteria occurred in North Sumatra. Medan City is the region with the highest regional economic development inequality with a value of 0.461, then the lowest regional development inequality occurs in Serdang Bedagai and Padang Lawas Utara districts with an IW of 0.000

3.1.4 Human development index (HDI)

The rise and fall of HDI figures is motivated by developments carried out by the central and regional governments. Based on Table 4, the HDI of North Sumatra in 33 urban districts in 2015-2020 with the highest index is Medan City. This is supported because the city of Medan is the capital of North Sumatra which is the center of all activities, namely education, health, and the economy which can help in the success of human development. The increase in HDI in North Sumatra per city district in 2015-2020 has increased every year which can show that in general human development in North Sumatra is improving.

Table 4. Human Development Index in North Sumatra Province 2015-2020

District/City	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Nias	58.85	59.75	60.21	60.82	61.65	61.93
Mandailing Natal	63.99	64.55	65.13	65.83	66.52	66.79
Tapanuli Selatan	67.63	68.04	68.69	69.10	69.75	70.12
Tapanuli Tengah	67.06	67.27	67.96	68.27	68.86	69.23
Tapanuli Utara	71.32	71.96	72.38	72.91	73.33	73.47
Toba Samosir	73.40	73.61	73.87	74.48	74.92	75.16
Labuhan Batu	70.23	70.50	71.00	71.39	71.94	72.01
Asahan	68.40	68.71	69.10	69.49	69.92	70.29
Simalungun	71.24	71.48	71.83	72.49	72.98	73.25
Dairi	69.00	69.61	70.36	70.89	71.42	71.57
Karo	72.69	73.29	73.53	73.91	74.25	74.43
Deli Serdang	72.79	73.51	73.94	74.92	75.43	75.44
Langkat	68.53	69.13	69.82	70.27	70.76	71.00

NiasSelatan	58.74	59.14	59.85	60.75	61.59	61.89
H. Hasundutan	66.03	66.56	67.30	67.96	68.83	68.87
PakpakBharat	65.53	65.81	66.25	66.63	67.47	67.59
Samosir	68.43	68.82	69.43	69.99	70.55	70.63
Serdang Bedagai	68.01	68.77	69.16	69.69	70.21	70.24
BatuBara	66.02	66.69	67.20	67.67	68.35	68.36
Padang Lawas Utara	67.35	68.05	68.34	68.77	69.29	69.85
PadangLawas	65.99	66.23	66.82	67.59	68.16	68.25
Labuhan batu Selatan	69.67	70.28	70.48	70.98	71.39	71.40
Labuan batu Utara	69.69	70.26	70.79	71.08	71.43	71.61
Nias Utara	59.88	60.23	60.57	61.08	61.98	62.36
Nias Barat	58.25	59.03	59.56	60.42	61.14	61.51
Sibolga	71.64	72.00	72.28	72.65	73.41	73.63
Tanjung Balai	66.74	67.09	67.41	68.00	68.51	68.65
Pematang siantar	76.34	76.90	77.54	77.88	78.57	78.75
Tebing Tinggi	72.81	73.58	73.90	74.50	75.08	75.17
Medan	78.87	79.34	79.98	80.65	80.97	80.98
Binjai	73.81	74.11	74.65	75.21	75.89	75.89
Padangsidimpuan	72.80	73.42	73.81	74.38	75.06	75.22
Gunung Sitoli	66.41	66.85	67.68	68.33	69.30	69.31
North Sumatra	**69.51**	**70.00**	**70.57**	**71.18**	**71.74**	**71.77**

3.2 Panel Data Regression Analysis Results.

3.2.1 Model estimation

It is necessary to select the estimation method to be used when performing panel data regression analysis, namely: the method with the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).

Common Effect Model/PLS

The approach used in the CEM method is the OLS method or the least squares method in estimating panel data. In table 5 below are the estimation results from CEM

Table 5. CEM Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-27.47188	3.85446	-7.127295	0.0000
LOG(IW)	0.154854	0.045933	3.371325	0.0009
LOG(HDI)	8.72104	0.908597	9.598358	0.0000

Fixed Effects Model (FEM)

The LSDV technique used in FEM aims to estimate panel data. Table 6 below is the estimation result of FEM.

Table 6 . FEM estimation results

Variabel	Coefficient	Std. Error	t-Statistic	Prob
C	-15.2875	0.547543	-27.92019	0.0000
LOG(IW)	0.010853	0.004276	2.537919	0.0121
LOG(HDI)	5.724345	0.128465	44.55944	0.0000
Cross-section fixed (dummy variabels)				

Random Effects Model (REM)

This method is called using the Generalized Least Square (GLS) technique with a model to estimate the intercept differences accommodated by the error term in the area studied. The following table is the estimation result of REM.

Table 7 . REM estimation results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.32174	0.569662	-26.89618	0.0000
LOG(IW)	0.010995	0.004273	2.572836	0.0108
LOG(HDI)	5.73254	0.12827	44.69115	0.0000

Panel Data Model Selection

In choosing the best model used for this study, the Chow Test and Hausman Test were carried out, namely as follows:

Chow test

The Chow test is a test to find out which model is suitable for use between CEM or FEM. Table 8 shows the Chow Test. The formulation of the hypothesis is:

$$H\ 0\ ,\ :\ CEM\ (>\ \alpha = 5\%) \quad (8)$$

$$H\ 1\ :\ FEM\ (<\ \alpha = 5\%) \quad (9)$$

Table 8. Chow test-Likelihood Ratio (Redundant Fixed Effect)

Effects Test	Stat.	d.f.	Prob.
Cross section F	**9436.781534**	**(32,163)**	**0.0000**
Cross section Chi^2	**1489.929328**	**32**	**0.0000**

It can be seen in Table 8, namely, the probability value of Cross section F is 0.00 (0.00 <0.05), then H1 is accepted and H0 is rejected. So, the suitable model is FEM.

Hausman test

After it was stated that the best model used was the FEM through the Chow Test. Furthermore, the test carried out is by testing the Hausman u test with the aim of knowing which model is suitable for use between REM or FEM. The hypothesis formulated is: H0 ,: REM (> α = 5%) H1: FEM (< α = 5%).

Table 9 . Hausman Test (Correlated Random Effect)

Test Sum	Chi^2. Statistic	Chi ^{2}. d.f.	Prob.
Crosssection -random	**3.350036**	**2**	**0.1873**

It can be seen in table 9 shows that the random cross-section probability value is 0.1873 which is greater than the significance level α = 5% (0.1873> 0.05), then H0 accept. Thus, the model is suitable for use in REM.

3.3 Hypothesis testing

3.3.1 t-test (Partial Test)

Testing the t-test or partial test is carried out to see the partial effect of regional development inequality and HDI variables on economic growth variables. Statistical test results on the research hypothesis are shown in the following table:

Table 10 . Statistical test results

Variabel	Coefficient	Std. Error	t-Stat.	Prob
C	-15.3217	0.569662	-26.8962	0.0000
LOG(IW)	0.010995	0.004273	2.572836	0.0108
LOG(HDI)	5.73254	0.12827	44.69115	0.0000

It is known that the results of the t-test:

a. The regional development inequality variable has a probability of 0.0108 which indicates a lower probability than the significance level of 0.05. These results indicate that regional development inequality has a significant influence on economic growth.
b. The HDI variable has a probability of 0.0000 which indicates a smaller probability than the significance level of 0.05. This shows that HDI has a significant effect on economic growth.

3.3.2 Statistical F Test (Simultaneous Test)

The F-statistic test aims to see the effect of all independent variables simultaneously on all dependent variables by comparing the probability value of the F-statistic with the level of significance. The hypothesis in this study are:
H 0 : There is no influence of regional development inequality and HDI simultaneously or simultaneously on Economic Growth in North Sumatra in 2015-2020. (prob>α=0.05)
H 1: There is an influence of regional development inequality and HDI jointly or simultaneously on Economic Growth in North Sumatra in 2015-2020. (prob<α=0.05).

Table 11. F-Statistics test results

F-stat.	1037.945
Prob(F-stat.)	0.000000

The table shows that there is a probability value (F-statistic) of 0.00. which shows a probability that is smaller than the significance level $\alpha = 0.05$ ($0.00 < 0.05$). Thus, H0 is rejected and H1 is accepted.

3.3.3 Determinant Coefficient Test R-Squared (R2)

The Determinant Coefficient Test R 2 was carried out with the aim of becoming a measuring tool for model expertise in describing variations in the dependent variable.

Table 12. Coefficient of Determination test results

R^2	**0.914131**
Adjusted R^2	**0.913250**

Based on the results of the regression analysis, the Adjusted R2 value was 0.914131. This means that 91.41% of economic growth in North Sumatra can be explained by regional development inequality variables and the human development index. While the remaining 8.59% is explained by other variables outside of other factors outside the object of this study.

4 Conclusion

The purpose of this exploration is to see the effect of Regional Development Inequality and HDI on Economic Growth in North Sumatra Province. From the results of the exploration that has been examined, experimenters get conclusions. Analysis using the Hausman test shows that the model that's suitable for explaining the influence and significance of indigenous development inequality and HDI variables on profitable growth is REM.

Testing with hypothesis statistical tests shows that the variables used, namely regional development inequality and HDI, are able to explain the direction of the influence of economic growth variables in accordance with the hypothesis, namely regional development inequality has a positive and significant effect and HDI also has a positive and significant effect. If there is a change, a 1% increase in the regional development inequality variable is accompanied by an increase in economic growth of 0.011%. and if there is a change in the 1% increase in the HDI variable, it is accompanied by an increase in economic growth of 5,732%. This means that if there is a change in the Regional Development Inequality and HDI variables, it will also change the economic growth of the research object. The research results also show that 91.41% of economic growth in North Sumatra can be described by regional development inequality and HDI variables. While the remaining 8.59% is indicated by other variables outside the model or other driving factors outside the research. The coefficient values of the variables explain that the largest coefficient is the HDI variable, followed by the Regional Development Inequality variable.

5 Suggestion

Based on the results of the research, it is suggested that the North Sumatra provincial government is able to coordinate and formulate policies and strategies that can encourage a regional development process that is evenly distributed in each district/city so that the inter-regional development gap in North Sumatra Province can shrink, especially in Medan City. And specifically in order to make the region grow fast in Pakpak Bharat Regency, it is hoped that the district government pays attention to development disparities between regions and the quality of the regional HDI quality because it will affect economic growth in Pakpak Bharat Regency. Regency/City local governments are expected to increase economic growth by seeking to increase HDI such as implementing policies in the education and health sectors so that economic activity and the standard of living of the population in disadvantaged districts of North Sumatra will also increas.

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