

The Effect of Fiscal Decentralization, Balanced Budget, Provincial Financial Aid, and Public Investment on Human Development Index with Population as a Moderation Variable in Regency/City Regional Government in North Sumatra Province

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DOI: <https://doi.org/10.52403/ijrr.20240230>

ABSTRACT

This research aims to analyze the influence of Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on the Human Development Index partially and simultaneously. This research also analyzes the influence of Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on the Human Development Index with Population as a moderating variable. The population of this research is the Regency/City Government in North Sumatra Province, totaling 33 Regency/Cities.

Data collection methods were carried out using documentation techniques using secondary data, namely APBD Realization Reports, Population Data, and Human Development Index data for 2017-2021. The sampling technique used was purposive sampling based on specific criteria. Based on these criteria, a total of 145 analysis units were obtained. The data analysis methods used in this research are descriptive statistical analysis methods, classical assumption tests, multiple linear regression analysis, sensitivity test analysis, hypothesis testing, and residual tests using SPSS version 25.

This research shows that Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment affect the Human Development Index. Partially, fiscal decentralization and provincial financial

assistance have positively affected the human development index. The Balancing Fund has a negative effect on the Human Development Index, and Public Investment does not affect the Human Development Index. This research also concludes that population is a moderating variable in strengthening and weakening the relationship between Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on the Human Development Index.

Keywords: *fiscal decentralization, balancing funds, provincial financial assistance, public investment, human development index, population.*

INTRODUCTION

The success of an area's development can be measured through several parameters. The human development index or HDI (Human Development Index) is the most popular. In 1996, the United Nations Development created the concept of the Human Development Index. The HDI concept is gaining popularity and is widely accepted as a tool for measuring and understanding the level of human development worldwide. The human development index is a metric that aims to evaluate the results of development performance in a region by showing the

quality of life of its population, including a decent standard of living, life expectancy, and level of education/intellectuality.

Based on the Human Development Index (HDI) published by UNDP, human development is defined as expanding human choices, meaning several processes determine improving aspects of human life. These aspects include adequate education, a decent standard of living, a long life, and better health. UNDP defines four human development pillars: productivity, equity, sustainability, and empowerment.

The Human Development Index is a simple combined average calculation of three basic indices: life expectancy, education, and decent living standard (Zaufi et al., 2016). The Human Development Index is one of the parameters for assessing and evaluating regional government performance. This performance is measured by allocating the Regional Revenue and Expenditure Budget (APBD). Regional Revenue and Expenditure Budgets that are right on target with community needs will positively impact education, health, and welfare (Larasita. et al., 2015).

Imanulloh & Purwanti (2015) state that regional governments must maximize revenue to finance regional expenditure so that infrastructure needs and public facilities can provide opportunities for the community to achieve a decent standard of living.

Various variations in regional financial independence can be seen from the proportion of original regional income to regional revenues. Regional governments in the North Sumatra region have a relatively balanced composition of PAD and balancing funds. In contrast, regional governments in Java are relatively more able to finance themselves with an average of 72% PAD of regional revenues. Most local governments in eastern Indonesia still have a very high dependency on balancing funds, namely around 70% and above (https://www.bpk.go.id/assets/files/magazine/edisi-112-no-xxviii--pemeriksaan-dana-perimbangan_majalah_pemeriksa_edisi_112

_no_xxviii which was accessed on 09 October 2022). It has given rise to PAD gaps between regions in Indonesia, thus encouraging the central government to allocate balanced funds to each region. The aim is to equalize regional financial capacity and finance every public service activity to improve the regional residents' welfare and quality of life. In Pramono and Soesilowati's (2016) research, the use of DAK and DAU, which are components of balancing funds for the provision of basic human infrastructure, namely education and health, was found to be able to improve the quality of life and quality of community education.

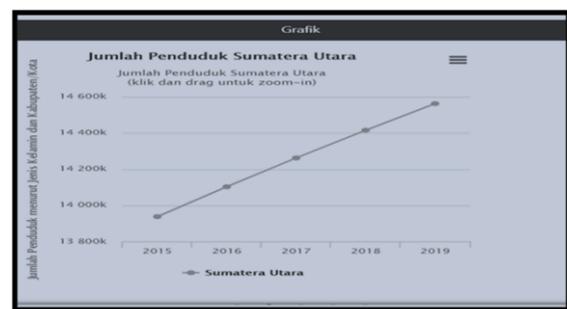


Figure 1. Population of North Sumatra Province 2015-2019
Source: Badan Pusat Statistik Sumatera Utara (2020)

In many cases, the populations of developing countries have experienced enormous growth. Figure 1.1 shows a graph of the population in North Sumatra Province in 2015-2019, as reported by the North Sumatra Central Statistics Agency. Based on this graph, there is an increase in population every year. The increasing population can be an indicator in APBD allocation, namely the components of Fiscal Decentralization, Balancing Funds, Public Investment, and Provincial Financial Assistance in terms of funding expenditure intended for the construction of facilities which are expected to be able to increase human development index.

The term population is used as a moderating variable, explaining that population is a benchmark for prioritizing the availability of public facilities such as education and health facilities. According to Law Number 33, population and area are some of the factors

that determine fiscal needs. Lumbantoruan (2013) explains that the presence of residents influences the availability of various public facilities. The more people live in a particular place, the more public facilities are available, and vice versa. Governments and policymakers can be more effective in planning and allocating resources to ensure the availability of public facilities that match the scale and needs of the local population. Human development and success depend on the role of government and government performance. The government's crucial role is allocation, distribution, stabilization, and rules and regulations. Through the role of the government and targeted fiscal policies in the APBD, it is hoped that the human development index can increase and improve residents' quality of life in all districts and cities.

Table 1. Human Development Index (Province) 2015-2020

Province	2015	2016	2017	2018	2019	2020
Aceh	69.45	70.00	70.60	71.19	71.90	71.99
Sumatera Utara	69.51	70.00	70.57	71.18	71.74	71.77
Sumatera Barat	69.98	70.73	71.24	71.73	72.39	72.38
Riau	70.84	71.20	71.79	72.44	73.00	72.71
Jambi	68.89	69.62	69.99	70.65	71.26	71.29
Sumatera Selatan	67.46	68.24	68.86	69.39	70.02	70.01
Bengkulu	68.59	69.33	69.95	70.64	71.21	71.40
Lampung	66.95	67.65	68.25	69.02	69.57	69.69
Kep. Bangka Belitung	69.05	69.55	69.99	70.67	71.30	71.47
Kep. Riau	73.75	73.99	74.45	74.84	75.48	75.59
DKI Jakarta	78.99	79.60	80.06	80.47	80.76	80.77
Jawa Barat	69.50	70.05	70.69	71.30	72.03	72.09
Jawa Tengah	69.49	69.98	70.52	71.12	71.73	71.87
Di Yogyakarta	77.59	78.38	78.89	79.53	79.99	79.97
Jawa Timur	68.95	69.74	70.27	70.77	71.50	71.71
Banten	70.27	70.96	71.42	71.95	72.44	72.45
Bali	73.27	73.65	74.30	74.77	75.38	75.50
Nusa Tenggara Barat	65.19	65.81	66.58	67.30	68.14	68.25
Nusa Tenggara Timur	62.67	63.13	63.73	64.39	65.23	65.19
Kalimantan Barat	65.59	65.88	66.26	66.98	67.65	67.66
Kalimantan Tengah	68.53	69.13	69.79	70.42	70.91	71.05
Kalimantan Selatan	68.38	69.05	69.65	70.17	70.72	70.91
Kalimantan Timur	74.17	74.59	75.12	75.83	76.61	76.24
Kalimantan Utara	68.76	69.20	69.84	70.56	71.15	70.63
Sulawesi Utara	70.39	71.05	71.66	72.20	72.99	72.93
Sulawesi Tengah	66.76	67.47	68.11	68.88	69.50	69.55
Sulawesi Selatan	69.15	69.76	70.34	70.90	71.66	71.93
Sulawesi Tenggara	68.75	69.31	69.86	70.61	71.20	71.45
Gorontalo	65.86	66.29	67.01	67.71	68.49	68.68
Sulawesi Barat	62.96	63.60	64.30	65.10	65.73	66.11
Maluku	67.05	67.60	68.19	68.87	69.45	69.49
Maluku Utara	65.91	66.63	67.20	67.76	68.70	68.49
Papua Barat	61.73	62.21	62.99	63.74	64.70	65.09
Papua	57.25	58.05	59.09	60.06	60.84	60.44
Indonesia	69.55	70.18	70.81	71.39	71.92	71.94

Source: Badan Pusat Statistik Sumatera Utara (2020)

According to Table 1 above, in 2020, DKI Jakarta Province had the highest Human Development Index achievement of 80.77, while Papua Province had the lowest achievement of 60.44. The striking

differences in the human development index explain that inequality between regions still shows the dynamics of human development in Indonesia. Indonesia's size and uneven development have caused inequality to occur, both between urban and rural areas, between provinces, between districts, between cities and districts, and between western and eastern regions. Until this year, Papua Province still had the highest inequality in human development between districts/cities in Indonesia.

This data shows that the Human Development Index for North Sumatra Province continues to be below the National Human Development Index every year. However, look at it from year to year. In that case, the Human Development Index for North Sumatra Province continues to increase yearly, showing progress in development in the Province. The increase in the Human Development Index in North Sumatra cannot be separated from the increase in the community's health, education, and welfare.

Table 2. Human Development Index in Regencies/Cities in North Sumatra Province 2015-2020

Regencies/Cities	2015	2016	2017	2018	2019	2020
01 Nias	58,85	59,75	60,21	60,82	61,65	61,93
02 Mandailing Natal	63,99	64,55	65,13	65,83	66,52	66,79
03 Tapanuli Selatan	67,63	68,04	68,69	69,10	69,75	70,12
04 Tapanuli Tengah	67,06	67,27	67,96	68,27	68,86	69,23
05 Tapanuli Utara	71,32	71,96	72,38	72,91	73,33	73,47
06 Tobo	73,40	73,61	73,87	74,48	74,92	75,16
07 Labuhanbatu	70,23	70,50	71,00	71,39	71,94	72,01
08 Asahan	68,40	68,71	69,10	69,49	69,92	70,29
09 Sibolga	71,24	71,48	71,83	72,49	72,96	73,25
10 Dairi	69,00	69,61	70,36	70,89	71,42	71,57
11 Karo	72,69	73,29	73,53	73,91	74,25	74,43
12 Deli Serdang	72,79	73,51	73,94	74,92	75,43	75,44
13 Langkat	68,53	69,13	69,82	70,27	70,76	71,00
14 Nias Selatan	58,74	59,14	59,85	60,75	61,59	61,89
15 Humbang Hasundutan	66,03	66,56	67,30	67,96	68,83	68,87
16 Pakpak Bharat	65,53	65,81	66,25	66,63	67,47	67,59
17 Sempit	68,43	68,82	69,43	69,99	70,55	70,63
18 Serdang Bedagai	68,01	68,77	69,16	69,69	70,21	70,24
19 Batu Bara	6,02	66,69	67,20	67,67	68,35	68,36
20 Padang Lawas Utara	67,35	68,05	68,34	68,77	69,29	69,85
21 Padang Lawas	65,99	66,23	66,82	67,59	68,16	68,25
22 Labuhanbatu Selatan	69,67	70,28	70,48	70,98	71,39	71,40
23 Labuhanbatu Utara	69,69	70,26	70,79	71,08	71,43	71,61
24 Nias Utara	59,88	60,23	60,57	61,08	61,98	62,36
25 Nias Barat	58,25	59,03	59,56	60,42	61,14	61,51
Cities						
26 Sibolga	71,64	72,00	72,28	72,65	73,41	73,63
27 Tanjungbalai	66,74	67,09	67,41	68,00	68,51	68,65
28 Bematangsiantar	76,34	76,90	77,54	77,88	78,57	78,75
29 Tebing Tinggi	72,81	73,58	73,90	74,50	75,08	75,17
30 Medan	78,87	79,34	79,98	80,65	80,97	80,98
31 Binjai	73,81	74,11	74,65	75,21	75,89	75,89
32 Padangsidimpuan	72,80	73,42	73,81	74,38	75,06	75,22
33 Gumay	66,41	66,83	67,68	68,33	69,30	69,31
Sumatera Utara	69,51	70,00	70,57	71,18	71,74	71,77

Source: Badan Pusat Statistik Sumatera Utara (2020)

Human development is a strategic issue, so its achievements must constantly be monitored. Table 1.2 explains that Medan

City has the highest Human Development Index of all North Sumatra Regencies/Cities from 2015 to 2020. In 2020, Medan City had a human development index of 80.98, and West Nias Regency had the lowest index of 61.51.

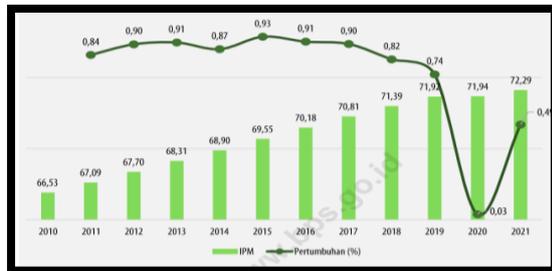


Figure 2. Development of the Human Development Index for North Sumatra Province
Source: Badan Pusat Statistik Sumatera Utara (2020)

One way to see human development in a region is to look at the growth of the Human Development Index. In 2020, the world faced the COVID-19 outbreak, which decreased the HDI by 0.03 percent. At the beginning of 2021, we began to adapt to new habits consisting of tightening health protocols to implementing work-from-home for work and school-from-home as well as COVID-19, which is increasingly under control, and economic activity is starting to recover, Indonesia's HDI has improved and will grow faster in 2021, namely 0.49 percent (Figure 2).

Nilai IPM	Status Pembangunan Manusia
< 60	Rendah
60 ≤ IPM < 70	Sedang
70 ≤ IPM < 80	Tinggi
≥ 80	Sangat Tinggi

Figure 3. Classification of Human Development Status
Source: Badan Pusat Statistik Sumatera Utara (2020)

Based on the data and information submitted, it can be seen that in 2020, the Human Development Index (HDI) in North Sumatra province reached 71.77. Figure 3, which depicts the classification of human development status, shows that North Sumatra province is in the "High" category

regarding human development compared to several other provinces in Indonesia. Human development in North Sumatra can be considered a good result. Even though the HDI for North Sumatra Province is in the "High" category, it is essential to note that this does not guarantee that all districts and cities in the province achieve high development standards. Several districts/cities in North Sumatra Province still show disparities in the human development index. For example, it can be seen that Medan City has a high HDI, reaching 80.98, while West Nias Regency has an HDI of 61.51. This difference shows that there is inequality between regions in terms of human development. Thus, it is essential to achieve equal development in all regions of North Sumatra Province. Even though the province has a high HDI, there remains a need to focus on areas that still face challenges in improving human development.

The following describes research on factors influencing HDI that researchers have carried out first. Anggraini and Sutaryo (2015) and Pramarta and Dwirandra (2018) concluded that fiscal decentralization positively and significantly affects the human development index. However, Zaufi et al. (2016) and Walinono et al. (2021) found that fiscal decentralization did not affect the Human Development Index.

Sarumaha (2015) stated that the Balancing Fund positively affects the Human Development Index. Zakaria (2016) concluded that the General Allocation Fund, Special Allocation Fund, and Profit Sharing Fund, which are components of the Balancing Fund, positively affect the Human Development Index. However, Widarwanto (2015) stated that the Special Allocation Fund, part of the Balancing Fund, does not affect the Human Development Index. Siburian et al. (2021) revealed that the research results on the General Allocation Fund and Profit Sharing Fund variables did not affect the Human Development Index.

Zakaria (2016) concluded that Provincial Financial Assistance positively affects the Human Development Index. However, Widarwanto (2015) found that Provincial Financial Assistance did not affect the Human Development Index.

Royan et al. (2015) state that Public Investment positively and significantly influences the Human Development Index. Then Handayani (2021) also stated that domestic investment positively and significantly affects the Human Development Index. However, research by Yacoub and Noviansyah (2018) concluded that investment does not affect the Human Development Index.

Wahyuningrum and Soesilowati (2021) and Jasasila (2020) stated that population size positively and significantly affects the Human Development Index. Meanwhile, Kiha et al. (2021) concluded that population size does not affect the Human Development Index.

Based on the background and phenomena and previous research described above, the author is interested in conducting research with the title: "The Effect of Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on the Human Development Index with Population as a Moderating Variable in Regency/Regency Regional Governments City in North Sumatera Province."

LITERATURE REVIEW

Human Development Index

The human development index focuses on three basic dimensions to measure human development capabilities. These dimensions include a decent life, a long and healthy life, and a level of knowledge and education. Building the quality of human (population) life is one of the critical indicators of human development. Success in achieving human development can be measured by looking at the extent to which various problems and challenges society faces can be overcome or resolved

through the development efforts undertaken. The more societal problems that are successfully overcome, the greater the achievements in human development. These problems include the availability of health services, education, poverty, and unemployment. UNDP periodically refines the calculation of the Human Development Index. UNDP made improvements using the three dimensions: a long and healthy life, knowledge, and a decent standard of living in 2010. However, it used new indicators, which previously, in 1995, used the Life Expectancy Rate, Literacy Rate, and Combination of Participation Rate indicators: Gross and Gross Domestic Product per Capita. The indicators used in 2010 were GDP per capita, average years of schooling, expected years of schooling, and life expectancy at birth.

The HDI aggregation method has also improved, from changing the arithmetic average to a geometric average. Meanwhile, the aggregation method for the education index changed from the geometric to the arithmetic average.

Indonesia uses a new method that was used in 2014 for calculating HDI. Data sources available in Indonesia include:

1. Life expectancy at birth (Population Census 2010/SP2010, Population Projections).
2. Expected number of years of schooling and the average length of schooling (National Socio-Economic Survey / SUSENAS).
3. Per capita expenditure is adjusted using SUSENAS data because GNI per capita is unavailable at the provincial, district, and city levels.

Based on BPS (2020), the formula used to calculate the Human Development Index is as follows:

$$\text{HDI} = \sqrt[3]{I_{\text{health}} \times I_{\text{education}} \times I_{\text{expenditure}}} \times 100$$

Fiscal Decentralization

According to Zaufi et al. (2016), decentralization has a strategic role in achieving state goals, especially in improving the quality of public services and encouraging a more democratic decision-making process. It is emphasized that by giving authority to regional governments from the central government, regions will experience a significant increase in the empowerment process. According to Pramatha and Dwirandra (2018), decentralization is delegating authority from the central government to regional governments. Delegation of authority covers various aspects, such as financial expenditure, authority to collect taxes, formation of a council elected by both the people and DPRD, as well as material assistance from the central government in the form of transfers of funds or other resources. Thus, decentralization creates space for local governments to take greater responsibility for governance and resource management at the local level.

To increase sectors that are benchmarks for HDI, such as education, health, and social welfare, the government uses Original Regional Income. If the PAD of an area is high, then the degree of decentralization will be high. PAD is an aspect that determines a region's success in implementing decentralization. The greater the Regional Original Income (PAD), the higher the regional financial capacity to provide the funds needed to fund expenditures related to increasing the Human Development Index and smoothly implementing government functions.

Fiscal decentralization indicators can be measured from the Realization of Regional Revenue and Expenditure Budgets during 2017-2021. Based on research by Siburian et al. (2021), the formula used to calculate Fiscal Decentralization is:

$$FD = \frac{\text{Original Local Government Revenue}}{\text{Total Local Revenue}} \times 100\%$$

Balancing Fund

According to Law Number 33 of 2004 concerning the financial balance between the central government and regional governments, the Balancing Fund consists of Profit-Sharing Funds (DBH), General Allocation Funds (DAU), and Special Allocation Funds (DAK). These funds are given to local governments to meet every need in implementing decentralization.

According to Law Number 33 of 2004 concerning financial balance, Profit Sharing Funds in the APBN are income sourced from national resources in the regions, namely taxes and natural resources. Profit Sharing Funds are allocated to reduce vertical disparities between central and regional governments by considering the economic potential of the regions that produce these resources. Profit Sharing Funds are given to producing regions under the proportions specified in Law No. 33 of 2004. This distribution is carried out with an approach that gives a larger portion to producing regions. In contrast, other regions in the province concerned receive a share to equalize income under the portion stipulated in the law.

Profit Sharing Funds aim to reduce disparities in financial capacity between the central and regional governments so that regions can determine their use of Profit-Sharing Funds and the Central Government cannot intervene (Maria et al., 2021). The greater the amount of Profit-Sharing Funds received by a region, the greater the possibility of realizing the hope of improving the quality of life through a longer lifespan, better education levels, and a higher standard of living for the community. It aligns with research by Widarwanto (2015) and Zakaria (2016), which states that profit-sharing funds positively affect the human development index.

According to Law Number 33 of 2004 concerning Financial Balance, General Allocation Funds, now abbreviated as

(DAU), are funds sourced from the APBN intended to fund regional needs in implementing decentralization. All districts and cities receive DAUs based on certain principles to fill the gaps between each region. The distribution of DAU proportions between provinces, districts, and cities is based on providing balanced authority between the provincial and district/city levels.

Based on the larger amount of General Allocation Funds received by a region, the potential will be created to increase life expectancy to a longer life expectancy, superior quality of education, and improve society's standard of living. It aligns with Widarwanto's (2015) research, which states that the General Allocation Fund positively affects the Human Development Index. Then Purba's research (2016) also stated that the General Allocation Fund positively affected the Human Development Index. According to Zaufi et al. (2016), Zakaria (2016), Sarumaha (2015), and Maria et al. (2021) also concluded that the General Allocation Fund has a positive effect on the Human Development Index.

Special Allocation Funds (DAK) are a source of funds obtained from the State Revenue and Expenditure Budget (APBN). These funds are given to regions to meet special needs, which are the region's responsibility and align with national priorities. Determination of these fund accounts for budget availability in the APBN. The needs referred to in this context include two aspects. First, funds are used to support special activities the Central Government determines based on national priorities. Second, funds are also allocated to support specific activities proposed by the regions themselves. According to Sarumaha's (2015) explanation in his research, the Special Allocation Fund is entirely intended for capital expenditures related to the provision and improvement of public facilities. In other words, no part of the

Special Allocation Fund covers development operational costs, such as official travel expenses and honorariums. The greater the Special Allocation Fund given to a region, the higher the life expectancy, the quality of education, and the society's standard of living. This is in line with research from Siburian et al. (2021), Zakaria (2016), Sarumaha (2015), and Maria et al. (2021), which states that Special Allocation Funds have a positive effect on the Human Development Index. Based on research by Pramatha and Dwirandra (2018), in calculating balancing funds, you can use the formula, namely:

$$BF = \frac{\text{Balancing Funds}}{\text{Total Local Revenue}} \times 100\%$$

Provincial Financial Assistance

Based on Minister of Home Affairs Regulation Number 13 of 2006, provincial financial assistance is used to budget general and specific financial assistance from the provincial government to districts/cities, village governments, and other regional governments or from district/city governments to village governments and regional governments. Others in the context of equalization or increasing financial capacity. General financial assistance is used to overcome fiscal gaps, while specific financial assistance functions as support for priority programs of regional or village governments that receive assistance. This support is per the scope of duties of the government under the authority of the aid recipient, in this case, the provincial government. Regional government entities manage provincial financial assistance funds that the provincial government has determined, be they district/city, village, or other regional governments. These funds finance programs and activities to achieve performance per predetermined targets. Provincial Financial Assistance must be aimed at building and improving public facilities that meet community

needs and increase community prosperity. Based on Widarwanto's research (2015), the formula used to calculate Provincial Financial Assistance is as follows:

$$PFA = \frac{\text{Provincial Financial Assistance}}{\text{Total Local Revenue}} \times 100\%$$

Public Investment

According to PSAP no. 6 of 2004, investments are assets intended to obtain economic benefits such as interest, dividends, royalties, or social benefits, which can increase the government's ability to provide services to the community. According to Government Regulation of the Republic of Indonesia Number 1 of 2008, investments made by the government aim to stimulate economic growth and improve the welfare of society through positive impacts of economic, social, and other aspects that may arise from the investment. Public investment or government investment usually aims to do something other than make a profit but rather to meet the needs of society. It is necessary to support implementing programs or activities that have become a government policy priority. By providing valuable facilities and infrastructure, public investment plays a role in improving the quality of human resources and accelerating economic growth. Indirectly, public investment increases the human development index and economic growth. Serang (2017) explains that the government can carry out efforts to improve the components of the Human Development Index through investment or expenditure aimed at financing or supporting certain facilities or public goods. Examples are the education, health, electricity services, clean water supply sectors, and social, educational, and health services to the community. In this case, investments with indirect impacts have the potential to contribute to increasing the Human Development Index and economic growth. By providing necessary services and facilities, such investments have a significant role in accelerating economic development and improving the quality of human

resources. Better availability of facilities and infrastructure related to educational facilities, health, and economic infrastructure can accelerate economic growth and human development indices. On the other hand, when the government needs to participate less in improving the quality of infrastructure, health, and economic infrastructure, the impact that may arise is a decline in the Human Development Index. Based on research by Simatupang (2014), in calculating Public Investment, you can use the formula, namely:

$$PI = \frac{\text{Equity Participation or Local Government Investment}}{\text{Regional Financing Expenditures}}$$

Total Population

According to the Central Statistics Agency, what is meant by Population is every individual who has lived in the geographical area of the Republic of Indonesia for six months or more or who has lived for less than six months but aims to stay. Population growth is not just a matter of numbers but is also related to society's future development and welfare. According to Serang (2017), population is considered a source that can expand markets or aggregate demand, contributing to economic growth and human development. When the population increases, there is the potential to spur faster economic growth, which will also positively impact human development performance. Population size is also an important indicator in APBD allocation, which includes components of Fiscal Decentralization, Balancing Funds, Public Investment, and Provincial Financial Assistance, which can be used in the development of public facilities such as education, health, and the interests of the community. Regional governments can invest in the development of facilities and infrastructure to convert the population into human capital that has the potential to be developed into high-quality capital that can contribute to economic growth. The increasing population can be an

indicator in APBD allocation, namely the components of Fiscal Decentralization, Balancing Funds, Public Investment, and Provincial Financial Assistance in terms of funding expenditure intended for the construction of facilities which are expected to be able to increase the human development index.

Based on BPS (2020), the formula used to calculate the population percentage is as follows:

$$TP = \frac{\text{Regency/City Population}}{\text{Total Province Population}}$$

Framework

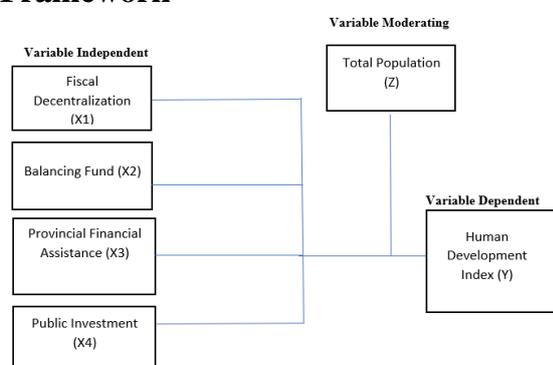


Figure 4. Framework

H1: Fiscal Decentralization has a positive effect on the Human Development Index

H2: The Balancing Fund positively affects the Human Development Index.

H3: Provincial Financial Assistance has a positive effect on the Human Development Index

H4: Public Investment has a positive effect on the Human Development Index

H5: Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment have a positive effect on the Human Development Index

H6: The population can moderate fiscal decentralization, balancing funds, provincial financial assistance, and public investment on the Human Development Index.

MATERIALS & METHODS

Based on the research objectives, this research is included in applied research.

Applied research is techniques, procedures, and research methods that are applied to collect information from various aspects regarding a situation, problem, or phenomenon so that the information collected can be used for other purposes such as formulating a policy, developing a program, modifying and evaluating a program, increasing understanding of a phenomenon, establishing causality and outcomes, identifying needs and developing strategies (Kumar, 2011). This research is classified as causal research based on the characteristics of the problem, namely research that identifies a causal relationship between two or several variables.

This research uses data obtained through access to three main sources, namely the website of the Directorate General of Regional Financial Balance (DJPK) of the Republic of Indonesia, the National Central Bureau of Statistics (BPS) of the Republic of Indonesia, the Central Bureau of Statistics of North Sumatra. This research was conducted at district/city governments in the province of North Sumatra.

The population in this study includes all districts and cities in the province of North Sumatra, totaling 33 districts/cities consisting of 25 Regency Governments and 8 City Governments.

The sample is a small portion of the members of the population. According to Siyoto and Sodik (2015), a sample is a small portion of the population members taken according to specific procedures so that it can represent the population, or the sample describes some of the characteristics and numbers of the population. This research uses a purposive sampling technique with certain objectives or considerations that the researcher has previously determined. The criteria used in considering research sampling are:

1. District/city regional governments in the province of North Sumatra which have compiled and collected data

related to the Realization of the Regional Revenue and Expenditure Budget (APBD) from 2017-2021 and have relevant data such as fiscal decentralization, balancing funds, provincial financial assistance and public investment.

2. Regency/city regional governments in the province of Sumatra have compiled HDI and population data, which can be accessed through the Central Statistics Agency's report from 2017 to 2021.

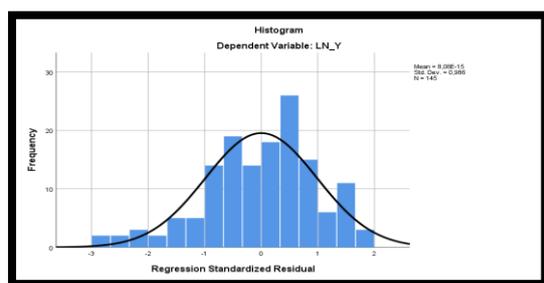
Regarding the research sample and criteria, it can be explained that this research used 29 samples from districts/cities in North Sumatra Province. The data was collected from 2017 to 2021, resulting in 145 observations analyzed (29 samples x 5 years). The sample did not include several regions, such as Mandailing Natal, Padang Lawas Regency, North Padang Lawas Regency, and Gunung Sitoli City, because some local governments did not have public investment data in the Regional Revenue and Expenditure Budget (APBD).

RESULT

A. Classic Assumption Test Results

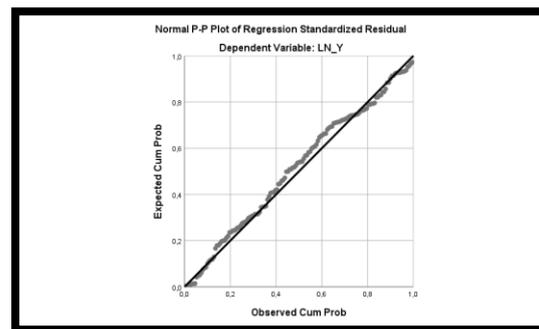
1. Normality Test Results

The normality of data in graphic analysis can be seen through histogram diagrams and normal probability plots. If the histogram graph is not skewed to the left or right, then the histogram graph is considered normal. If the data is spread around and follows the direction of the diagonal line, the Normal probability plot will show a normal distribution.



Source: Data processed by SPSS 22
Figure 5. Histogram Graph

Based on Figure 5 regarding the histogram graph presented, it can be concluded that it shows a normal distribution pattern, not skewed to the left or right. Then, the same thing as the normal probability plot graph shown in Figure 6 shows that the points spread close to the diagonal line and around the diagonal. The regression model does not violate the normality assumption, as these two graphs show.



Source: Data processed by SPSS 22
Figure 6. Probability Plots

2. Multicollinearity Test

The multicollinearity test is carried out to test whether there are independent variables that are similar to other independent variables in one model. In a good regression model, there should be no correlation between the independent variables. Tolerance and Variance Inflation Factor (VIF) values can be used to see the presence of multicollinearity in a regression model. A study is free from multicollinearity tests if the Variance Inflation Factor (VIF) value is < 10 and the Tolerance value is > 0.1 . The results of the multicollinearity test can be seen in the following table:

Table 3. Multicollinearity Test

Model		Collinearity Statistics		
		B	Tolerance	VIF
1	(Constant)	4,075		
	LN X1	,048	,577	1,734
	LN X2	-,043	,235	4,254
	LN X3	,044	,202	4,955
	LN X4	,009	,701	1,427

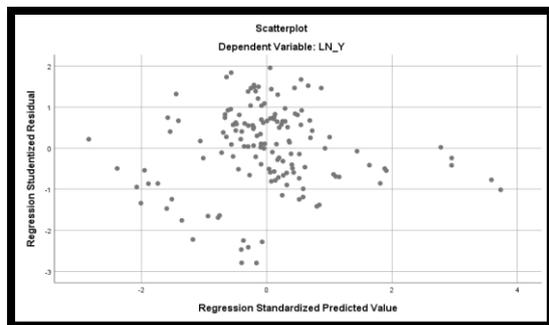
Source: Data processed by SPSS 22

From the multicollinearity test presented in Table 3, it can be seen that there are no

symptoms of multicollinearity between the research variables. It is shown by a VIF number < 10 and a tolerance value > 0.10.

3. Heteroscedasticity Test

According to Ghozali (2013), the Heteroscedasticity Test aims to test whether inequality of variance in the regression model occurs from the residuals of one observation to another. If the variance of the residual from one observation to another is constant, it is called homoscedasticity; if the variance is different, it is called heteroscedasticity. A regression model is said to be good if there is no heteroscedasticity.



Source: Data processed by SPSS 22
Figure 7. Scatterplot Test

The data processed by SPSS 22 presented in Figure 7 shows the points spread above and below or around 0. The data points are not collected only above or below, and the distribution of data points does not form a certain pattern.

4. Autocorrelation Test

According to Ghozali (2013), the autocorrelation test is used to test in the linear regression model whether there is a correlation between confounding errors in period t and confounding errors in period t-1 (previously). If correlation occurs, then there is an autocorrelation problem in a study. Regression that is free from autocorrelation is a good regression model.

Table 4. Autocorrelation Test Results

Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	.498	34,713	4	140	.000	1,899

Source: Data processed by SPSS 22

Based on the Autocorrelation Test in Table 4, the DW value from the regression output is 1.899. The dU value can be seen in the DW table at a significance of 0.05 with n (amount of data) = 145 and k (number of independent variables) = 4, the obtained dU value = 1.7856 and 4-dU = 2.2144, which means there is no autocorrelation problem in the regression model because 1.7856 < 1.899 < 2.2144.

B. Multiple Regression Analysis

Table 5. Results of Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,075	,348		11,708	,000
	LN X1	,048	,009	,419	5,318	,000
	LN X2	-,043	,021	-,253	-2,050	,042
	LN X3	,044	,012	,490	3,677	,000
	LN X4	,009	,006	,110	1,536	,127

Source: Data processed by SPSS 22

In Table 5, related to the results of the multiple regression analysis above, a multiple linear equation model can be obtained, which is formulated as follows:

$$Y = 4,075 + 0,048 X1 + 0,009 X4 - 0,043 X2 + 0,044 X3 + \epsilon$$

Based on the multiple linear equation model above, it can be explained as follows:

1. The constant value is 4.075, which means that if the value of the independent variables, namely fiscal decentralization, balancing funds, provincial financial assistance, and public investment, is zero or assumed to be constant, then the value of the dependent variable human development index is 4.075.
2. The fiscal decentralization coefficient (X1) value is 0.048, which is a positive value. If the fiscal decentralization variable increases by one unit or 1%, the

human development index variable increases by 0.048.

3. The value of the balancing fund coefficient (X2) is -0.043, a negative value. If the balancing fund variable increases by one unit or 1%, the human development index variable decreases by 0.043.
4. The coefficient value of provincial financial assistance (X3) is 0.044, which is a positive value. If the provincial financial assistance variable increases by one unit or 1%, the human development index variable increases by 0.044.
5. The public investment coefficient (X4) value is 0.009, which is a positive value. If the regional investment variable increases by one unit or 1%, the human development index variable increases by 0.009.

C. Hypothesis Test

1. Simultaneous Test (F-Test)

Table 6. Simultaneous Test Results

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,353	4	,088	34,713	,000 ^b
	Residual	,356	140	,003		
	Total	,709	144			
a. Dependent Variable: LN_Y						
b. Predictors: (Constant), LN_X4, LN_X2, LN_X1, LN_X3						

Source: Data processed by SPSS 22

Table 6 shows that the calculated F value is 34.713 with a significance level of 0.000. The significance level is less than 0.05, which means that the first hypothesis, which states that fiscal decentralization, balancing funds, provincial financial assistance, and public investment simultaneously influence the human development index in districts and cities in North Sumatra Province, is accepted.

2. Partial Test (t-Test)

Table 7. Partial Test Result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,075	,348		11,708	,000
	LN_X1	,048	,009	,419	5,318	,000
	LN_X2	-,043	,021	-,253	-2,050	,042
	LN_X3	,044	,012	,490	3,677	,000
	LN_X4	,009	,006	,110	1,536	,127

Source: Data processed by SPSS 22

Table 7 explains that Fiscal Decentralization (X1), Balancing Funds (X2), and Provincial Financial Assistance (X3) have a significant effect on the Human Development Index (HDI) partially. Meanwhile, Public Investment (X4) has no significant effect on the Human Development Index (HDI).

3. Coefficient of Determination

Table 8. Coefficient of Determination Test Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,706 ^a	,498	,484	,05042

a. Predictors: (Constant), LN_X4, LN_X2, LN_X1, LN_X3

b. Dependent Variable: LN_Y

Source: Data processed by SPSS 22

The linear regression results in Table 8 illustrate that the coefficient of determination (Adjusted R2) is 0.484 or 48%. This coefficient of determination (Adjusted R2) value indicates that the variables Fiscal Decentralization (X1), Balancing Funds (X2), Provincial Financial Assistance (X3), and Public Investment (X4) can explain variations in the dependent variable Human Development Index (Y) of 0.484 or 48%. Meanwhile, 52% is explained by other variables not included in this research model.

4. Moderating Test

Table 9. Results of the Total Population Significance Test are Moderating the Influence of Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on Human Development Index

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,167	,034		4,860	,000
	Ln_Y	-,010	,003	-,296	-3,711	,000

Source: Data processed by SPSS 22

From the table above, the residual model can be formulated in the form of the following equation:

$$|e| = 0,167 - 0,010 \text{ IPM} + e$$

Based on Table 9 above, the regression coefficient of the Human Development Index is negative at -0.010, and the significance

level is $0.000 < 0.05$. A variable is said to be moderating if it has a negative coefficient and has a significant effect at a level < 0.05 . Thus, population moderates the influence of Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on the Human Development Index.

Sensitivity Test Analysis Results

Table 10. Sensitivity Test Analysis Results (T-Test)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,095	,340		12,046	,000
	Transform LNX1	,048	,009	,426	5,401	,000
	Transform LNX2	-,042	,021	-,251	-2,034	,044
	Transform LNX3	,042	,012	,484	3,630	,000
	Transform LNX4	,008	,005	,106	1,484	,140

a. Dependent Variable: Transform_LNY

Source: Data processed by SPSS 22

In Table 10, related to the results of the sensitivity analysis above, a year lag model can be obtained, which is formulated as follows:

$$Y = 4,095 + 0,048 X1_{it-1} - 0,042 X2_{it-1} + 0,042 X3_{it-1} + 0,008 X4_{it-1} + \epsilon_{it-1}$$

The results of the T-test sensitivity test based on Table 10 partially explain the influence of each independent variable on the dependent variable, namely the Fiscal Decentralization variable with a statistic of 5.401 at a confidence level of $\alpha = 5\%$ with a significance probability of 0.0000 which is smaller than $\alpha = 0,05$ concluded that the Fiscal Decentralization variable as (X1) has a significant effect on the Human Development Index (HDI) in district and city governments in North Sumatra Province. The explanation of the Balancing Fund variable as (X2) with a statistic of -2.034 at a confidence level of $\alpha = 5\%$ with a significance probability = 0.044, which is smaller than $\alpha = 0.05$, concludes that the Balancing Fund variable has a significant effect on the Human Development Index (HDI) in district and city governments in North Sumatra Province. Then, the Provincial Financial Assistance variable as (X3) has a significant effect on the Human

Development Index (HDI) in district and city governments in North Sumatra Province with a statistic result of 3.630 at a confidence level of $\alpha = 5\%$ with a significance probability of 0.000 which is smaller than $\alpha = 0.05$. The final variable is Public Investment as (X4) with a statistic of 1.484 at a confidence level of $\alpha = 5\%$ with a significance prob.= 0.140, which is greater than $\alpha = 0.05$, so it can be concluded that the Public Investment variable has no significant effect on the Human Development Index (IPM) in district and city governments in North Sumatra Province. Sensitivity testing using the one-year lag method showed that the results were identical to previous research. The Public Investment variable still shows results that do not affect the Human Development Index.

Table 11. Sensitivity Test Analysis Results (F Test)

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,337	4	,084	34,721	,000 ^b
	Residual	,339	140	,002		
	Total	,676	144			

a. Dependent Variable: Transform_LNY

b. Predictors: (Constant), Transform_LNX4, Transform_LNX2, Transform_LNX1, Transform_LNX3

Source: Data processed by SPSS 22

Based on the F-test sensitivity test results in Table 11, the calculated F value is 34.721, with a significance level of 0.000. A significance level of less than 0.05 explains that the variables fiscal decentralization, balancing funds, provincial financial assistance, and public investment together influence the human development index in districts/cities in North Sumatra province.

CONCLUSION

Based on the discussion in the previous chapters and answered problem formulation, research objectives, and referring to the process and results of data analysis in this study, several conclusions can be drawn as follows:

1. Fiscal decentralization, balancing funds, provincial financial assistance, and public investment simultaneously influence the human development index in districts and cities in North Sumatra Province.

2. Partially, the influence of each independent variable on the dependent variable can be described as follows:
 - a. Fiscal Decentralization positively affects the Human Development Index in district/city governments in North Sumatra Province.
 - b. The Balancing Fund has a negative effect on the Human Development Index in district/city governments in North Sumatra Province.
 - c. Provincial Financial Assistance positively affects the Human Development Index in district/city governments in North Sumatra Province.
 - d. Public Investment does not affect the Human Development Index in district/city governments in North Sumatra Province.
3. The population variable can moderate the relationship between Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment on the Human Development Index in district/city governments in North Sumatra Province.

LIMITATIONS

Based on the discussion and conclusions that have been put forward, this research still has several limitations, including:

1. Fiscal Decentralization, Balancing Funds, Provincial Financial Assistance, and Public Investment must be properly detailed. This is because the data was obtained partially. The Balancing Fund should be better separated into General Allocation Funds, Special Allocation Funds, and Profit-Sharing Funds to be researched to determine how much influence the relationship has with the Human Development Index in Regencies/Cities in North Sumatra.
2. The independent variable used can only explain variations in the dependent variable of 0.484 or 48%,

so there may still be many other variables that are thought to be able to explain variations in the dependent variable (HDI).

SUGGESTIONS

Based on the conclusions of this research, several suggestions can be made, namely as follows:

1. It is recommended that further research be carried out to increase the number of research observations and expand the research objects to districts/cities on the island of Sumatra or districts/cities in Indonesia.
2. It is recommended for further research to use a more detailed allocation variable for the use of Original Regional Income on the Human Development Index, for example, the components of Regional Taxes, Regional Levies, Other Legal Regional Assets, and Other Regional Income. It is to further explain, specifically in further research, the influence of each component of the regional original income structure on the human development index. Then, future researchers can also use the economic growth variable to analyze how much influence it has on the Human Development Index.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Anggraini,T & Sutaryo.2015. Pengaruh Rasio Keuangan Pemerintah Daerah Terhadap Indeks Pembangunan Manusia Pemerintah di Provinsi di Indonesia. Fakultas Ekonomi Universitas Sebelas Maret.
2. Badan Pusat Statistik.2020. Data Statistik BPS. Medan: BPS Pusat Pemerintah Provinsi Sumatera Utara.

3. Ghozali, Imam, 2013. Aplikasi Analisis Multivariate dengan Program IBM SPSS 21 Update PLS Regresi, Edisi Ketujuh. Semarang: Badan Penerbit Universitas Diponegoro.
4. Handayani.2021. Pengaruh Pertumbuhan Ekonomi, Investasi, dan Belanja Modal Terhadap Kesejahteraan Masyarakat di Jawa Tengah Tahun 2012-2018. Jurnal Economic Volume 10, Nomor 1, Tahun 2021, Hal 1. ISSN: 2337-3814. Universitas Diponegoro.
5. Jasasila.2020. Pengaruh Tingkat Kemiskinan dan Jumlah Penduduk terhadap Indeks Pembangunan Manusia (IPM) pada Kabupaten Batang Hari 2011-2019. Jurnal Ilmiah Ilmu Ekonomi dan Bisnis. ISSN 2580-6882, Volume 2087-5304.
6. Kiha, E.K, Seran, S & Lau, H, T. 2021. Pengaruh Jumlah Penduduk, Pengangguran, dan Kemiskinan terhadap Indeks Pembangunan Manusia di Kabupaten Belu. Jurnal Ekonomi, Sosial dan Humaniora. E-ISSN 2686-5661. Volume.2, No. 07.
7. Kumar, R. 2011. Research Methodology: A step-by-step guide for beginners. Edition 3. Sage Publication Ltd. London.
8. Larasita, Y. F, Istiyani, N. & Jumiati. A. 2015. Pengaruh Pendapatan dan Belanja Daerah (APBD) Terhadap Indeks Pembangunan Manusia di Kabupaten Jember Periode 1990-2014. Jurnal Ekonomi dan Studi Pembangunan. Universitas Jember.
9. Lumbantoran, J. W. W. L. (2013). Analisis Ketersediaan Fasilitas Pelayanan Sosial Ekonomi di Kecamatan Batang Kuis Kabupaten Deli Serdang. Jurnal Ekonomi 149-155
10. Maria, E., Halim, A. & Luthfan, M. 2021. Dana Perimbangan dan Pembangunan Manusia: Sebuah Bukti Pengujian dari Pulau Kalimantan. Journal of Applied Business and Eonomi Economics Vol. 7 No. 3 (Maret, 2021) 306-324.
11. Pramatha, A. & Dwirandra, AN. 2018. Pengaruh Desentralisasi Fiskal, Belanja Modal, dan Investasi Swasta Terhadap Indeks Pembangunan Manusia. Jurnal Akuntansi Universitas Undayana ISSN: 2302-8556, Vol. 22. 3. Maret (2018): 2458-2482.
12. Pramono, Y. A., & Soesilowati, E.2016. Determinan Kualitas Pembangunan Manusia di Kabupaten/Kota Provinsi Jawa Tengah. Economics Development Analysis Journal, 5(3), 269–277
13. Purba, S. P., 2016. Pengaruh Pendapatan Asli Daerah, Dana Alokasi Umum, dan Dana Alokasi Khusus Terhadap Indeks Pembangunan Manusia Melalui Belanja Modal dan Pertumbuhan Ekonomi Pada Kabupaten/Kota di Provinsi Sumatera Utara. Tesis. Universitas Sumatera Utara, Medan.
14. Royan, M., M, Jumiati, A, & Prianto, F. W. 2015. Pengaruh Investasi Publik dan Swasta Terhadap Peningkatan Indeks Pembangunan Manusia (IPM) di Jawa Timur. Fakultas Ekonomi, Universitas Jember.
15. Sarumaha, P. 2013. Pengaruh Pendapatan Asli Daerah, Dana Perimbangan, dan Lain-Lain Pendapatan Daerah yang sah terhadap Indeks Pembangunan Manusia Melalui Belanja Daerah Pada Kabupaten/Kota di Provinsi Sumatera Utara. Tesis, Universitas Sumatera Utara, Medan.
16. Serang, M., R., 2017. Pengaruh Pengeluaran Pemerintah, Produktivitas Tenaga Kerja, dan Faktor Demografi Terhadap Kinerja Pembangunan Manusia di Kabupaten/Kota Provinsi Maluku, Jurnal Ekonomi Vol. XI, No 2, Desember 2017. ISSN 1978-3612. Fakultas Ekonomi Universitas Pattimura.
17. Simatupang, N. L. 2014. Analisis Kinerja Keuangan dan Investasi Pemerintah Terhadap Pertumbuhan Ekonomi, Pengangguran, dan Kemiskinan (Di Kabupaten/Kota di Provinsi Sumatera Utara). Tesis. Universitas Sumatera Utara.Medan
18. Siyoto, S. & Sodik, A, .2015. Dasar Metodologi Penelitian.(ISBN : 978-602-1018-18-7). Literasi Media Publishing, Juni (2015). Yogyakarta.
19. Wahyuningrum, F, & Soesilowati, E. 2021. The Effect of Economic Growth, Population and Unemployment on HDI. Indonesian Journal of Development Economics. Volume 4(2) (2021):1217-1229. Universitas Negeri Semarang.
20. Walinono, Kadir, & Anwar. 2021. Effect of financial reform and fiscal decentralization In Bone, Indonesia. Journal Vol.26,

- no.Esp.2, pp.49-64, 2021. Universidad Del Zulia. Venezuela.
21. Widarwanto & Atanasius. 2015. Pengaruh Dana Alokasi Umum (DAU), Dana Alokasi Khusus (DAK), Pendapatan Asli Daerah (PAD), Dana Bagi Hasil (DBH) dan Bantuan Keuangan Provinsi (BKP) terhadap Indeks Pembangunan Manusia (IPM) dengan Belanja Pelayanan Dasar sebagai Moderating Variabel. Tesis, Universitas Sumatera Utara, Medan.
22. Yacoub & Noviansyah. 2018. Impact Economic Growth to Human Development Index. Jurnal Prosiding SATIESP. FEB Universitas Tanjungpura.
23. Zakaria. 2016. Faktor-Faktor yang Mempengaruhi Indeks Pembangunan Manusia dengan Belanja Modal sebagai Variabel Intervening Pada Pemerintah Kabupaten/Kota di Provinsi Sumatera Utara. Tesis, Universitas Sumatera Utara, Medan.
24. Zaufi, M.Y., Taufik,T.&Agusti, R.2016. Pengaruh Desentralisasi Fiskal, Dana Alokasi Umum (DAU), Dana Alokasi Khusus (DAK), dan Pendapatan Asli Daerah Terhadap Indeks Pembangunan Manusia dengan Belanja Modal sebagai Variabel Intervening di 12 Kabupaten/Kota SE-Provinsi Riau. Jurnal Ekonomi Volume 24, Nomor 3 September 2016.

How to cite this article: Mohammad Syarif Hafizh Simatupang, Azhar Maksum, Chandra Situmeang. The effect of fiscal decentralization, balanced budget, provincial financial aid, and public investment on human development index with population as a moderation variable in Regency/City Regional Government in North Sumatra Province. *International Journal of Research and Review*. 2024; 11(2): 278-293. DOI: <https://doi.org/10.52403/ijrr.20240230>
