

An In-Depth Analysis of the Contribution of the Human Development Index and Labor Force to the Gross Regional Domestic Product in Regencies/Cities of Jambi Province

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ABSTRACT

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This research is entitled "The Influence of the Human Development Index and Labor Force on the Gross Regional Domestic Product of Regencies/Cities in Jambi Province". The first aim of this research is to determine and analyze the development of the human development index, labor force and GRDP in Jambi Province. Second, to determine and analyze the influence of the human development index and workforce on district/city GRDP in Jambi Province. The research method used was secondary data analysis with quantitative methods using 11 districts/cities in Jambi Province. Multiple linear regression analysis tool using panel data with the help of the Eviews application.

The results of the analysis concluded that the first is that the human development index for districts/cities in Jambi Province has an overall average of 71.76 percent with Jambi City having the highest HDI, namely 79.35 percent higher than the overall HDI. Meanwhile, East Tanjung Jabung Regency has the lowest HDI with an HDI below the overall HDI average, namely 66.95 percent. For the district/city workforce in Jambi Province, the overall average increased by 1.07 percent or 166,549 people, with the highest increase occurring in Muaro Jambi Regency with the average increase above the overall increase in the workforce, namely 2.92 percent. Meanwhile, West Tanjung Jabung Regency, on average, the workforce decreased by -0.77 percent. And the gross regional domestic product of districts/cities in Jambi Province as a whole increased by an average of 3.38 percent with the highest increase occurring in Batanghari Regency with an average increase in gross regional domestic product of 5.09 percent and the lowest occurring in the Regency. East Tanjung Jabung with an increase in gross regional domestic product of 0.73 percent during the 2018-2023 period. Second, partially using FEM panel data, only the human development index (HDI) has a significant effect on increasing gross regional domestic product in the 2018-2023 period. Meanwhile, the labor force (AK) does not have a significant effect on increasing the gross regional domestic product of districts/cities in Jambi Province. With the highest increase in gross regional domestic product if the human development and labor force index remained constant, it occurred in West Tanjung Jabung Regency and the lowest in Kerinci Regency. With a high level of confidence, HDI and AK influence district/city GRDP by 99.25 percent.

1. INTRODUCTION

Regional development is an integral part of national development efforts, aiming to improve the administrative capabilities of regional governments, thereby fostering competent and professional capabilities in managing government and providing superior services to the public. Regional progress can be reflected in the Gross Regional Domestic Product (GRDP), which reflects the added value of all economic activities in a region, or the total value of final goods and services produced by economic units (Suryana, 2018).

As the main indicator to evaluate the state of the economy in a given area over a certain period, both at current values and in fixed prices, Produk Domestik Regional Bruto (PDRB) is

usually the sum of the value added produced by all the business units in a region. With a total population of 3,679,169 in 2023, Provinsi Jambi is the seventh-most populous province on Sumatra Island. The success of any development is highly dependent on the makeup of its people; a big and high-quality population has the capacity to drive economic development. A large productive age population will directly affect economic development by means of the availability of highly sought-after productive labor required for the execution of economic development. In Province Jambi, this situation will help to drive economic growth and development. 2023 saw Province Jambi's working-age population (15–64 years) total 2. 538. 928 people. But in 2023 there are 1, 887, 840 employees in Jambi Province.

One can argue that a significant aspect of the economy is the population of productive age since a big population of that age will increase labor supply, automatically raising the amount of labor, whereas human development will affect the quality of the workforce. Rising quality of human resources and a larger labor force are critical for economy correction. Because economic growth demands not just physical capital but also human capital. Human modals can be invested in both healthcare and education. While education is absolutely necessary to boost productivity, health is the major requirement for enhancing a country's capacity to embrace contemporary technology and generate sustainable development. Because both serve as input and output in the aggregate production process (Todaro 2013), education and health might be considered as crucial markers of expansion and development.

Improvements in human development are required in Jambi Province if one wants to stimulate economic growth. Human development is a model of expansion of possibilities for every person to live a respectable existence. Naturally, this seeks to create a situation in which every human being can live a long and healthy life, get enough training and abilities, and make enough income to support a respectable standard of living. Health, education, and purchasing power offer insights into the caliber of human capital. Better quality of human capital would affect productivity levels, which would support economic expansion and therefore advance regional development.

Human resource development aims to improve basic human capabilities, which are necessary to increase opportunities to contribute to the development process. This improvement can be achieved through improvements in health, education, and productivity, which aims to create quality human resources. Three basic dimensions serve as the basis for measuring a country's human development achievements. These dimensions include a long and healthy life, characterized by Life Expectancy at Birth (AHH); knowledge, characterized by Average Years of Schooling and Expected Years of Schooling; and a decent standard of living, characterized by purchasing power (BPS, 2023). The Human Development Index (HDI) is an indicator used to assess the progress of human development over the long term.

Economic expansion depends critically on an increase in the labor force paired with quality human resources developments. Improving human development and growing the workforce should favorably affect economic expansion since a skilled workforce increases productivity. The ability to take in and control resources for economic development depends on human development. Good human development will maximize the use of production factors, therefore obtaining best results.

According to Ranis, Stewart, and Ramirez (in Todaro, 2013), there is a two-way relationship between economic growth and human development. On the one hand, economic growth provides resources for improving human development. On the other hand, improving human quality is a crucial contributor to economic growth.

The following presents the development of data on gross regional domestic product, human development index, and district/city workforce in Jambi Province in 2023.

Table 1.1

Gross Regional Domestic Product, Human Development Index, and Labor Force Data for Regencies/Cities in Jambi Province 2017-2023

Regency/City	ADHK GRDP (Rupiah)	HDI (Percent)	Workforce (Soul)
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	2022	2023	2022	2023	2022	2023
Kerinci	7,125,000,000,000	7,533,400,000,000	73.24	73.77	139,997	140,787
Merangin	10,973,700,000,000	11,553,500,000,000	70.98	71.81	203,256	194,882
Sarolangun	12,163,900,000,000	12,652,500,000,000	72.66	73.05	151,895	143,953
Batang Hari	13,728,200,000,000	14,236,000,000,000	71.99	72.5	129,347	144,112
Muaro Jambi	18,179,000,000,000	19,320,900,000,000	71.41	72.26	235,033	233,135
East Tajab	17,471,900,000,000	17,850,400,000,000	68.96	69.85	120,684	119,854
West Tanjab	31,866,600,000,000	32,984,800,000,000	70.88	71.44	177,204	171,400
Tebo	11,260,600,000,000	11,767,300,000,000	71.14	71.99	185,722	180,288
Bungo	13,733,900,000,000	14,373,700,000,000	73.08	73.57	194,319	196,264
Jambi City	20,543,200,000,000	21,901,300,000,000	80.38	80.93	303,517	311,048
Full River	4,980,500,000,000	5,225,300,000,000	76.75	77.2	43,304	52,117
Average	14,729,681,818,182	15,399,918,181,818	72.86	73.49	171,298	171,622

Source: Central Statistics Agency (BPS) Jambi Province 2024, Data processed

Based on Table 1.1, it can be seen that the average value of the ADHK GRDP of regencies/cities in Jambi Province increased by 4.67 percent during the 2022-2023 period, or the average ADHK GRDP in 2022 was Rp. 14,729,681,818,182, rising to Rp. 15,399,918,181,818 in 2023. The highest increase in ADHK GRDP occurred in Jambi City with an increase of 6.61 percent, or from the 2022 ADHK GRDP of Rp. 20,543,200,000,000, rising to Rp. 21,901,300,000,000 in 2023. Meanwhile, the lowest increase in ADHK GRDP occurred in Tanjung Jabung Timur Regency, which saw a large increase in ADHK GRDP of 2.17 percent or from ADHK GRDP in 2022, which was Rp. 17,471,900,000,000 to Rp. 17,850,400,000,000. Meanwhile, the highest human development index value also occurred in Jambi City, with a large HDI value in 2022 of 80.38, increasing in 2023 to 80.93. Meanwhile, in Tanjung Jabung Timur Regency, the lowest human development index (HDI) with a 2022 HDI value of 68.96, increasing in 2023 to 69.85. However, if viewed on average, there was an increase in the Human Development Index in districts/cities in Jambi Province of 0.87 percent during the 2022- 2023 period with an average of 72.86 in 2022, increasing in 2023 with the Human Development Index being 73.49 in districts/cities in Jambi Province.

And for the workforce in regencies/cities in Jambi Province during the period of 2022 to 2023 also experienced an increase of 1.71 percent with an increase in the workforce from 171,298 people in 2022 to 171,622 people in 2023. Based on table 1.1 above, it can be seen that the data on the largest number of workforces is in Jambi City with a workforce of 303,517 people in 2022 increasing in 2023 to 311,048 people.

Meanwhile, the lowest number of workforces occurred in Sungai Penuh City with a workforce of 43,304 people in 2022 and increasing in 2023 to 52,117 people in the workforce. The increasing number of workforces and the improving number of workforces and the improving quality of human development should have a positive impact on economic growth because a qualified workforce has better productivity.

Therefore, further research is needed on the HDI, labor force, and ADHK GRDP. Furthermore, this research has the potential to provide recommendations for more sustainable development policies, particularly in integrating HDI improvement programs and labor force management to stimulate economic growth in districts/cities in Jambi Province.

2. Research Methods and Techniques

Research methods

The method used in this research employs a descriptive and quantitative approach. This approach tests the research hypothesis by emphasizing the analysis of processed data and the use of numbers in statistical calculations. Furthermore, this research describes the phenomena that occurred accurately and factually.

A quantitative approach was also used to determine the significant relationship between the variables studied, such as GRDP as the dependent variable, and the Human Development Index and Labor Force as the independent variables. The selection of this quantitative method was based on data from the Central Statistics Agency (BPS) using panel data for 11 districts/cities in Jambi Province.

The descriptive approach uses statistical methods that focus on a particular population or sample, presentation, management, and summary of data collection, with conclusions drawn as a result.

Using literature studies, descriptive quantitative research aims to explain the conditions being studied. This further strengthens the researcher's analysis when arriving at the results. The research results are obtained by calculating research variable indicators, which are then presented in writing.

Data Analysis Methods

This data analysis method validates the findings, which is very important. This technique describes the number of other ideas that contradict the research findings and compares them with the conclusions. To address the initial research objective, namely to understand how the human development index, labor force, and GRDP in Jambi Province are developing, descriptive and quantitative analysis is used. And to address the second problem, namely to see the size of the independent variable against the dependent variable, multiple linear regression analysis is used using panel data for 11 districts/cities. This study uses multiple regression analysis to test its hypotheses using panel data. This analysis is used to determine whether each independent variable has a positive or negative relationship with the dependent variable and to predict whether the value of the dependent variable will increase or decrease, namely between the Human Development Index (HDI), Labor Force (AK), and Gross Regional Domestic Product (GRDP). The variable relationship model is analyzed using the multiple linear regression equation using panel data, namely:

$$\text{LogPDRBit} = \beta_{0it} + \beta_1 \text{IPM}_{it} + \beta_2 \text{LogAK}_{it} + e_{it}$$

Where:

GRDP = Gross Regional Domestic Product (Rupiah)

β_0 = Constant

$\beta_1 \beta_2$ = Regression coefficient

HDI = Human Development Index (Percent)

AK = Labor Force (People)

it = Regency/City i year t

Log = Logarithm

e = Standard error/ Error terms

Determination Test (R-Squared)

The determination test shows how well a regression model can explain the dependent variable. Additionally, the coefficient of determination (R-squared) can be used to indicate how much the independent variables contribute to the regression model; the higher the R-squared value, the greater the role the independent variables can play in explaining the dependent variable.

3. Results and Discussion

Multiple Regression Analysis

This study analyzes the influence of the human development index and labor force on gross regional domestic product in regencies/cities in Jambi Province from 2018 to 2023. The analytical tool used is panel data with a multiple regression analysis model completed with the support of the computer statistics program, Eviews 8.0. The data processing results presented here are considered

the best estimates because they can meet the criteria of economic theory, statistics, and econometrics. These estimation results are expected to be able to answer the hypotheses proposed in this study.

Based on the observation period, this study uses the period from 2018 to 2023. The sample used consists of districts/cities in Jambi Province. Based on the panel data, the panel data regression model consists of three approaches: the Pooled Least Squares model, the Fixed Effect model, and the Random Effect model.

$$\text{LogPDRBit} = 24.42363 + 0.027814\text{IPMit} + 0.313064\text{LogAKit} + \mu\text{it}$$

$$\text{F-test} = 580.6618$$

$$\text{R-Squared} = 0.992451$$

From the results of the regression equation above, the overall value of the β_0 coefficient for districts/cities is 24.42363. This means that if there is no change in the human development index (HDI) and labor force (AK) in the 2018-2023 period or with constant assumptions, then the gross regional domestic product (GRDP) for all districts/cities will experience an increase of 24.42363 percent. This indicates that the description of the regression results can be seen that even though the human development index and labor force do not experience changes in the sense of being constant, they still increase the gross regional domestic product. The increase in GRDP may come from capital-intensive sectors, such as mining or large manufacturing industries, which do not involve much local labor. In addition, the less than optimal improvement in the quality of human resources for economic growth. This is because the HDI and AK are usually calculated with aggregate data that differs from GRDP data. The increase in GRDP may only occur in the short term, while the HDI and AK data reflect long-term conditions.

For the regression coefficient of the human development index (HDI) variable (β_1), the value obtained is 0.027814, meaning that if there is an increase or increase in the human development index (HDI) by 1 percent, it will increase the gross regional domestic product (GRDP) by 0.0278 percent assuming that other variables remain constant (*Ceteris paribus*) or there is no change or constant. The increase in HDI in Jambi Province creates a healthier, more educated, and more productive society. This encourages labor productivity, domestic consumption, investment, and economic diversification, all of which contribute to the increase in GRDP.

Furthermore, the regression coefficient of the labor force (AK) variable (β_2) obtained a value of 0.313064, meaning that if there is an increase or increase in the labor force (AK) by 1 percent, it will increase the gross regional domestic product (GRDP) by 0.313064 percent assuming that other variables remain constant (*Ceteris paribus*) or there is no change or constant. Most of the workforce in Jambi may work in the informal sector or part-time jobs, but with low productivity and inadequate income. Increasing the workforce alone is not enough to increase GRDP if it is not accompanied by an increase in the quality of the workforce, productive employment opportunities, and economic transformation. Focus on education, training, and economic diversification is very important so that the increasing number of workers can have a significant impact on the GRDP of Jambi Province.

Furthermore, a systematic analytical approach is required to ensure the model is appropriate for use and produces interpretable results. To calculate the intercept (β_0) coefficient for each district/city in Jambi Province, the following formula can be used: Individual intercept of district/city $i = i\text{-th intercept } (\beta_{0i}) + \text{overall intercept } (\beta_0)$ The results of the district/city intercept calculation can be obtained as follows:

BATANGHARI—C	0.057047	+ 24.42363 = 24.48068
BUNGO—C	-0.017390	+ 24.42363 = 24.40624
KERINCI—C	-0.593701	+ 24.42363 = 23.82993
KERINCI REGENCY—C	0.036330	+ 24.42363 = 24.45996
CITY OF SUNGAI PENUH—C	-0.708294	+ 24.42363 = 23.71534
MERANGIN—C	-0.232253	+ 24.42363 = 24.19138
MUARO JAMBI—C	0.238500	+ 24.42363 = 24.66213

SAROLANGUN—C	-0.077281	+ 24.42363 = 24.34635
TANJABBARAT—C	0.927395	+ 24.42363 = 25.35103
EAST TANJAB—C	0.552899	+ 24.42363 = 24.97653
TEBO—C	-0.183250	+ 24.42363 = 24.24038

Using the Fixed Effect estimation technique from this panel data, we can also see the differences between 11 districts/cities in Jambi Province in increasing gross regional domestic product. This difference can be seen from the difference in the β_0 coefficient (intercept) between districts/cities. In this case, West Tanjung Jabung Regency has the highest β_0 (intercept) of 25.35103, meaning that if there is a change in the human development index (HDI) and labor force (AK) both between regions and over time, West Tanjung Jabung Regency has the highest individual influence on increasing gross regional domestic product of 25.35103 percent.

The high intercept value of Tanjung Jabung Barat Regency is due to Tanjung Jabung Barat Regency's very strategic geography in the regional economy of Jambi Province, which connects Malaysia, Singapore - Growth Triangle (IMS-GT). Therefore, in an effort to position itself as one of the important keys, the Tanjung Jabung Barat Regency Government needs to prepare itself with good regional infrastructure, socio- cultural, economic, general government and so on. In the aspect of general government, Tanjung Jabung Barat Regency also strives to realize Good governance and as accountability for the implementation of the main tasks and functions in managing resources and implementing policies taken. In addition, the effects on the Human Development Index and AK may take time to be seen, because improving the quality of life and welfare of the community requires long-term development.

Despite increasing GRDP, the labor force remains stable if economic growth is driven more by productivity gains than by job creation. Tanjung Jabung Barat Regency may experience rapid growth in the palm oil and oil and gas plantation sectors. These sectors contribute significantly to GRDP, although their impact on the Human Development Index (HDI) and Childhood Education (AK) may take longer to become apparent. Consequently, Tanjung Jabung Barat Regency experienced the highest GRDP increase compared to other regencies/cities in Jambi Province.

On the other hand, Kerinci Regency has the lowest β_0 (intercept) of 23.82993. If there is a change in the human development index (HDI) and labor force (AK) both between regions and over time, then Kerinci Regency gets an individual influence on the gross regional domestic product (GRDP) of 23.82993 percent. The low intercept value is due to the total development index and labor force in Kerinci Regency being relatively stable compared to other regencies/cities with a rank of 3 for HDI and rank 5 for AK.

This is because Kerinci Regency is known as an agricultural region with significant potential in the agriculture, plantation, and natural tourism sectors (such as Mount Kerinci and Lake Kerinci). The economy, dominated by these sectors, tends to be stable in the long term, although its growth is relatively slow compared to the industrial or trade sectors in urban areas. As a result, Kerinci Regency has been unable to address the economic disparity between regions, resulting in lower GRDP growth in Kerinci Regency compared to other regencies/cities in Jambi Province.

The explanation above demonstrates the need for local governments to play a role in increasing suboptimal GRDP (Gross Domestic Product) in order to improve public welfare. Therefore, local government efforts to improve the Human Development Index (HDI) and effective workforce management will create a positive cycle, where a healthy, educated, and productive workforce drives economic growth, which in turn improves public welfare.

The HDI has a significant relationship with gross regional domestic product (GRDP) because the quality of human resources influences productivity, innovation, and a region's economic capacity. Higher levels of economic well-being increase people's purchasing power, encourage consumption, and create a ripple effect across other economic sectors. A high HDI is typically associated with reduced poverty rates, allowing more people to contribute productively to the economy.

In contrast, the labor force (AK) is insignificant in its contribution to GRDP due to various

factors, such as the dominance of capital-intensive sectors, low labor quality, and minimal economic diversification. To increase the labor force's contribution to GRDP, policies are needed that focus on increasing productivity, investing in human resources, and developing economic sectors that can optimally utilize the workforce.

However, when looking at the inter-district/city relationship in Jambi Province, the highest increase in GRDP occurred in West Tanjung Jabung Regency, while the lowest increase in GRDP occurred in Kerinci Regency with a confidence level of 99.25 percent. The human development index and labor force dominantly influence the gross regional domestic product during the 2018-2023 period. These results are in accordance with previous research conducted by Muhammad Hatta, Muhammad Nur, and Evi Salvianti (2021) entitled "The Effect of the Human Development Index on Gross Regional Domestic Product in Sindereng Rapang Regency." The results show that the Human Development Index variable has a positive and significant effect on GRDP, while the Labor variable has no effect and is not partially significant. The independent variables also have a significant effect and are positively related to the dependent variable simultaneously.

Coefficient of Determination Test (R²)

The R-squared calculation results shown in Table 5.5 above yield an R-squared value of 0.992451. This indicates that approximately 99.25 percent of the fluctuations in gross regional domestic product (GRDP) are influenced by changes in the human development index (HDI) and labor force (AK). The remaining 0.75 percent is explained by other variables not included in the regression equation. It is possible that other important variables (e.g., infrastructure, investment, or policy) were not included, thus biasing the analysis.

4. Conclusion and Suggestions

Conclusion

Based on the discussion of the results of data analysis in this study, the following conclusions can be drawn:

- 1) The overall average human development index for districts/cities in Jambi Province is 71.76 percent, with Jambi City having the highest HDI at 79.35 percent, higher than the overall HDI. Meanwhile, East Tanjung Jabung Regency has the lowest HDI with a HDI below the overall HDI average of 66.95 percent. The overall average for the district/city workforce in Jambi Province increased by 1.07 percent or 166,549 people, with the highest increase occurring in Muaro Jambi Regency with an average increase above the overall increase in the workforce of 2.92 percent. Meanwhile, West Tanjung Jabung Regency saw an average workforce decrease of -0.77 percent. And for the gross regional domestic product of regencies/cities in Jambi Province as a whole, it increased by an average of 3.38 percent with the highest increase occurring in Batanghari Regency with an average increase in its gross regional domestic product of 5.09 percent and the lowest occurring in Tanjung Jabung Timur Regency with an increase in its gross regional domestic product of 0.73 percent during the 2018- 2023 period.
- 2) Partially, using FEM panel data, only the human development index (HDI) significantly influences the increase in gross regional domestic product (GRDP) in the 2018-2023 period. Meanwhile, the labor force (AK) does not significantly influence the increase in GRDP of regencies/cities in Jambi Province. The highest increase in GRDP when the human development index and labor force remain constant occurs in West Tanjung Jabung Regency and the lowest in Kerinci Regency. With a confidence level of 99.25 percent, the HDI and AK influence GRDP of regencies/cities.

Suggestion

After drawing conclusions, the author can put forward several suggestions as follows:

- 1) To increase GRDP in the regencies/cities of Jambi Province, the influence of the Human Development Index (HDI) and the labor force can be maximized through policies focused on improving the quality of education, health, skills training, and infrastructure that supports mobility and job market access. Diversifying economic sectors and creating high-quality jobs, particularly in sectors with high added value, are also key to driving sustainable economic growth.
- 2) District/city governments need to design job creation programs that focus on sectors that can absorb a large workforce with high productivity, such as the manufacturing and services sectors in Jambi Province in the future.

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