PAPER – OPEN ACCESS

Analysis of the Influence of the Industrial Sector on the Gross Regional Domestic Product of the Medan City

Author : Swanto Gunawan Situmorang and Coki Ahmad Syahwier
DOI : 10.32734/lwsa.v8i1.2407
Electronic ISSN : 2654-7066
Print ISSN : 2654-7058

Volume 8 Issue 2 – 2025 TALENTA Conference Series: Local Wisdom, Social, and Arts (LWSA)

LWSA Conference Series 08 (2025)
TALENTA Conference Series
Available online at https://talentaconfseries.usu.ac.id

Analysis of the Influence of the Industrial Sector on the Gross Regional Domestic Product of the Medan City

Swanto Gunawan Situmorang, Coki Ahmad Syahwier

Universitas Sumatera Utara, Medan 20155, Indonesia

swantogunawan200@gmail.com

Abstract

This study analyses the impact of the industrial sector on the regional gross domestic product (GDP) in Medan City. The data type for this study is quantitative, and secondary data from the Central Statistics Agency (BPS) of Medan City and North Sumatra Province are used. The analytical method used in this research uses E-views and is analysed using simple linear regression with a time series from 1993 to 2022. The dependent variable in this study is the GDP of Medan City, while the independent variables include the output value of large and medium-sized industries and the number of employees in the large and medium-sized industry sector. The test results indicate that the output value of industry has a positive and significant effect on the regional gross domestic product (GDP) in Medan City, while the manufacturing labour force has a negative effect. At the same time, both the output value of industry and labour have a significant effect on the Gross Domestic Regional Product (GDP) in Medan City.

Keywords: GDP; Output Value Industries; Employed

1. Introduction

The industrial sector is one of the main pillars of a country's economic structure. Through organised and sustainable production activities, the industrial sector plays an important role in supporting economic growth, creating jobs, and promoting innovation and technological development.The role of the industrial sector in the economic progress of Medan City is a key factor that makes a significant contribution to the growth and development of this city [1] and [2]. By conducting a comprehensive analysis, it will be possible to determine the extent to which the industrial sector of Medan City influences the overall growth of the Gross Domestic Product [3]. This analysis will also provide a complete picture of the strengths and weaknesses of the industrial sector in the city, and provide clear guidance for policy makers in planning sustainable economic development strategies. By understanding the influence of the industrial sector as a whole [4] and [5].

Table 1. Contribution of Industrial Sector GRDP to Medan City GRDP

Year	Medan City GRDP (Billion Rupiah)	Industrial Sector GRDP (Billion Rupiah)	Percentage of Industrial Sector Contribution
2018	222,483.24	32,497.42	14.61%
2019	241,482.35	34,414.46	14.25%
2020	242,198.84	34,186.37	14.12%
2021	254,721.96	36,233.53	14.22%
2022	280,159.04	39,700.11	14.17%

Source: Badan Pusat Statistik

Selection and peer-review under responsibility of Event of Young Researcher and Economics Students (EVEREST) VIII
p-ISSN: 2654-7058, e-ISSN: 2654-7066, DOI: 10.32734/lwsa.v8i1.2407

2. Literature Review

The definition of GRDP is the amount of value added of goods and services produced by all economic activities in all regions in a given year or period, usually one year [2]. An important way of assessing the economic health of a region over a period of time is to look at Gross Regional Domestic Product (GRDP) data, both at current prices and at prices adjusted for inflation [6]. GRDP is basically the amount of value added produced by all businesses in an area, or the total value of net goods and services produced by all economic units. The manufacturing industry is an economic activity that involves the transformation of raw materials or primary products into finished or semi-finished products by means of mechanical, chemical or manual processes [1] and [4]. The aim of this activity is to add value to goods by bringing them closer to the final consumer. It also includes industrial or manufacturing services and assembly. An enterprise or industry is an economic unit that carries out economic activities, aims to produce goods or services, is located in a specific building or place, has its own administrative records of production and cost structure, and has one or more persons responsible for the enterprise.

Production is an effort to create, increase the utility of goods by combining factors of production to meet needs. Production is an economic activity that delivers goods/services to consumers. And production is the process of transforming inputs into outputs. Every production process has a technical basis called the production function. The production function is a function or equation that shows the physical or technical relationship between the number of factors of production used and the number of products produced per unit of time, without taking into account prices, both the prices of factors of production and the prices of products. Labour is any person who is capable of doing work to produce goods and/or products and services to meet their needs and the needs of society. In classical theory, Adam Smith also saw that the effective allocation of human resources is the starter of economic growth [7] and [8].

3. Methods

The type of research that will be carried out is quantitative descriptive research. This research aims to provide a solution to a problem and gain a deeper understanding of a phenomenon by using a quantitative approach.The variables used in this research are industrial output value as X_1 and number of workers as X_2. Meanwhile, the dependent variable used in this research is GRDP as Y. Multiple linear regression analysis is a data analysis method that involves more than one independent variable and is generally used to determine the extent to which the independent variable influences the dependent variable [9]. The type of data used in this research is time series, which refers to data arranged based on time sequence from 2005 to 2020. The data in this research will be analysed using the Eviews 10 program [10].

The following is the formulation of the multiple linear regression model used in this research.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + e$$

Description :
Y = GRDP (Gross Regional Domestic Product)
α =Constant
β_1, β_2 = Variable Regression Coefficient
X_1 = Industrial Output Value (Rp)
X_2 = Labor (People)
E = Error Term (Disturbing variable)

4. Results and Discussion

The purpose of testing this classical assumption is to provide assurance that the regression equation obtained is accurate in estimation, unbiased and consistent. Classical assumptions are the conditions that must be met in the OLS linear regression model for the model to be valid as an estimation tool. The summary of the research results regarding the analysis of the impact of the industrial sector on the Gross Regional Domestic Product (GRDP) of the city of Medan is as follows:

Tabel 2. Classical Assumption Test Results

Prob.	Description.
4.850	Normally distributed data
58.75 , 6542.20	There is no multicollinearity
4.9368	There is no heteroscedasticity
0.721	There is no autocorrelation

Source: Researcher Processed Data

The results of the classical assumption tests, presented in Table 2, confirm that the regression model meets all the necessary assumptions. The data is normally distributed, as indicated by a probability value of 4.850. There is no multicollinearity, evidenced

by values of 58.75 and 6542.20. Additionally, the model shows no signs of heteroscedasticity (value of 4.9368) or autocorrelation (probability value of 0.721), ensuring the reliability of the regression analysis.

Table 3. Multiple Linear Regression Analysis Results

Variable	Coefficient	t-Stat.
C	10.80282	2.419478
LOGOUTPUT	1.000915	24.01436
LOGTK	-0.936381	-2.271920

Source: Researcher Processed Data

Table 3 presents the results of the multiple linear regression analysis, showing the coefficients and t-statistics for the variables. The constant (C) has a coefficient of 10.80322 and a t-statistic of 2.419478, representing the intercept in the regression equation. The variable LOGOUTPUT has a coefficient of 1.000915 and a significant t-statistic of 24.01436, indicating a strong positive influence on the dependent variable. In contrast, LOGTK has a coefficient of -0.936381 and a t-statistic of -2.271920, reflecting a significant negative relationship with the dependent variable.

Table 4. Results of the Coefficient of Determination (R2)

Variable	t-Statistic	Prob.
LOGOUTPUT	24.01436	0.0000
LOGTK	-2.271920	0.0313

Source: Researcher Processed Data

Table 4 highlights the coefficient of determination (Adjusted R^2), which is 0.953534. This value indicates that approximately 95.35% of the variation in the dependent variable is explained by the independent variables in the model, demonstrating a high level of explanatory power, although there are still some limitations in explaining the variables.

Tabel 5. Partial Test Results (t-Statistic Test)

Variable	t-Statistic	Prob.
LOGOUTPUT	24.01436	0.0000
LOGTK	-2.271920	0.0313

Source: Researcher Processed Data

The significance of each independent variable is further detailed in Table 5 through the partial t-statistic test. LOGOUTPUT has a t-statistic of 24.01436 with a probability value of 0.0000, making it highly significant in explaining the dependent variable. Meanwhile, LOGTK has a t-statistic of -2.271920 and a probability value of 0.0313, showing it is also significant, though with a negative impact.

Tabel 6. 5 Simultaneous Significance Test Results (Statistical F Test)

F	Prob.	Description.
298.5534	0.000000	Significant

Source: Researcher Processed Data

Finally, Table 6 presents the results of the F-test, which evaluates the overall significance of the model. The F-value of 298.5534 and a probability value of 0.000000 confirm that the regression model is statistically significant. This means that the independent variables, when considered together, significantly explain the variation in the dependent variable.

5. Conclusion

The research results show that the Industrial Output Value has a significant effect on the Gross Regional Domestic Product (GRDP) of Medan City with a t-statistic value of 24,014 and a Prob.(Significance) value of 0.000 (<0.05). The research results

are consistent with the theory and hypothesis which states that industrial output value has a positive effect on the GRDP of Medan City. Labour has no significant effect on the Gross Regional Domestic Product (GRDP) of Medan City with a t-statistic value of -2.271 and a Prob.(Significance) value of 0.0313 (<0.05). Based on the results of research and discussion conducted by researchers, the following conclusions can be drawn.The test results show that the Industrial Output Value has a positive and significant effect on Gross Regional Domestic Product (GRDP) in Medan City. Labor has a negative and significant effect on Gross Regional Domestic Product (GRDP) in Medan City. Simultaneously, the value of industrial output and labor has a significant effect on Gross Regional Domestic Product (GRDP) in Medan City.

References

[1] Jasman, S. (2013). “Analisis Kontribusi Sektor Industri Terhadap PDRB Kota Medan”. Jurnal Ekonomika Dan Pembangunan, 13(1), 12-21.
[2] Nikensari, S. I. (2018). “Ekonomi Industri Teori dan Kebijakan”. Samudra Biru, Yogyakarta.
[3] Robert Tua Siregar, D. (2021). “Ekonomi Industri”. Yayasan Kita Menulis, Medan.
[4] Solikin, A. (2022). “Peran Sektor Industri Pengolahan dalam Perekonomian Empat Provinsi di Pulau Jawa”. Jurnal Ekonomi dan Bisnis, 9(2), 25-34.
[5] Jones, C., & Romer, P. (2010). "The Role of Industrialization in Regional Economic Growth". Journal of Economic Perspectives, 24(3), 120-145.
[6] Acemoglu, D. (2015). "Economic Growth and Industrial Structure". Cambridge University Press.
[7] Smith, A. (1776). "The Wealth of Nations". W. Strahan and T. Cadell.
[8] Krugman, P. (1991). "Increasing Returns and Economic Geography". Journal of Political Economy, 99(3), 483-499.
[9] United Nations Industrial Development Organization (UNIDO). (2019). "Industrial Development Report". Vienna.
[10] Todaro, M. P., & Smith, S. C. (2020). "Economic Development". Pearson Education.