

THE APPLICATION OF DYNAMIC REGRESSION ANALYSIS MODELS IN DETERMINING FACTORS AFFECTING THE ECONOMIC GROWTH OF SMALL AND MEDIUM ENTERPRISES (SMES) IN PADANGSIDIMPUAN CITY USING THE ORDINARY LEAST SQUARE (OLS) METHOD

Lilis Saryani¹, Hery Dia Anata Batubara^{2*}, Rizaldy Khair³

^{1,2}Graha Nusantara University, ³Politeknik LP3I Medan

ARTICLE INFO

Keywords:

Dynamic Regression Analysis Model; MSME; OLS; Padangsidimpuan

ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) are a very important economic sector in Indonesia, and also in Padangsidimpuan City. According to data from the Ministry of Cooperatives and Small and Medium Enterprises, in 2020, the number of MSMEs in Indonesia reached 64.2 million business units, with a contribution to Gross Domestic Product (GDP) of 60.34% and creating employment of 97.18 million people. However, despite its great potential, the MSME sector still faces various obstacles in developing its business, especially in increasing economic growth. One of these obstacles is the limited resources owned by MSMEs, both in terms of capital, labor, market access, technology, and so on. Padangsidimpuan City as one of the cities in North Sumatra Province has great potential in the development of MSMEs. One of the analytical methods that can be used to analyze the factors that influence the economic growth of MSMEs is the dynamic regression analysis model using the Ordinary Least Square (OLS) method. The urgency of the research is the increasing role of MSMEs as contributors to the economic growth of Indonesia and Padangsidimpuan City in particular. MSMEs are considered a strategic sector in economic development, especially in creating jobs and increasing the competitiveness of the national economy. However, MSMEs still experience obstacles in developing their businesses, especially in increasing economic growth. The purpose of this study is to analyze the factors that influence the economic growth of MSMEs in Padangsidimpuan City using the dynamic regression analysis model and the Ordinary Least Square (OLS) method. In addition, this study also aims to provide recommendations to the government and business actors in increasing the economic growth of MSMEs in Padangsidimpuan City.

E-mail:

anata.batubara@gmail.com

Copyright © 2023 Economic Journal. All rights reserved.
is Licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License \(CC BY-NC 4.0\)](https://creativecommons.org/licenses/by-nc/4.0/)

1. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) play an important role in Indonesia's economic development. According to data from the Ministry of Cooperatives and SMEs, the contribution of MSMEs to Indonesia's GDP in 2020 reached 60.34%. However, MSMEs still face obstacles in increasing their economic growth, such as limited business capital, lack of managerial skills, and lack of access to technology and markets. This suggests that it is necessary to analyze the factors that influence the economic growth of MSMEs (1). One of the cities in Indonesia that has the potential to develop MSMEs is Padangsidimpuan City in North Sumatra Province. The city has a lot of potential natural resources and a sizable population. However, the economic growth of MSMEs in Padangsidimpuan City is still relatively low and not optimal. Therefore, it is necessary to conduct research on the factors that influence the economic growth of MSMEs in this city. By using this method, it is expected to find what factors affect the

The Application Of Dynamic Regression Analysis Models In Determining Factors Affecting The Economic Growth Of Small And Medium Enterprises (Smes) In Padangsidimpuan City Using The Ordinary Least Square (Ols) Method, Lilis Saryani, et.al.

economic growth of MSMEs in Padangsidempuan City, so as to provide appropriate recommendations for decision makers in developing MSMEs in this city (2). In this study, the variables to be tested include business capital, labor, turnover, and technology. Testing of these variables is carried out using the dynamic regression analysis method with the Ordinary Least Square (OLS) method, so that a strong relationship can be found between these variables and the economic growth of MSMEs in Padangsidempuan City (3). That way, it is hoped that this research can contribute to the development of economics and business science in Indonesia and provide appropriate recommendations for the government and business people in developing MSMEs in Padangsidempuan City.

Approach and Problem Solving

Based on the existing problem formulation, the existing problem-solving approaches include:

1. Using a dynamic regression analysis model with the Ordinary Least Square (OLS) method to identify and estimate what factors affect the economic growth of MSMEs in Padangsidempuan City.
2. Collecting data through surveys and interviews with MSME business actors in Padangsidempuan City to obtain more complete information about these factors.
3. Using valid and reliable statistical testing techniques to determine the relationship between the variables that have been determined and the economic growth of MSMEs.
4. Using appropriate and tested statistical techniques in conducting data analysis to produce accurate and reliable recommendations for the government and business people in developing MSMEs in Padangsidempuan City.
5. Finding factors that affect the economic growth of MSMEs in Padangsidempuan City and providing appropriate recommendations for decision makers in developing MSMEs in the city.
6. To contribute to the development of economics and business science in Indonesia.
7. Contribute to regional economic development.

Needs Analysis

1. Data Collection

Data collection is important because with data collection, the results will be analyzed carefully and in accordance with the conditions in the field, because good analysis results will be obtained if the information obtained is also adequate. The data used in this study are primary data and secondary data.

a. Primary Data

Primary data is a source of research data obtained directly from the original source in the form of interviews, polls from individuals or groups (people) as well as observations of an object, event or test result.

b. Secondary Data

Secondary data is data obtained from records, books, and magazines in the form of government reports, articles, books as theory, magazines, and so on. The data obtained from this secondary data does not need to be processed again because the source does not directly provide data to data collectors.

2. METHOD

A. Type of Research

The type of research conducted is quantitative research using a dynamic regression analysis model and the Ordinary Least Square (OLS) method. Quantitative research is research that aims to test hypotheses by collecting data through measurement and statistical analysis to answer research questions. The dynamic regression analysis model used in this study is one of the regression analysis techniques that is able to take into account the dynamic factors that affect the dependent variable. In this model, the dependent variable and the independent variable are considered as stochastic processes (random variables) that change dynamically over time (6). The OLS method is used to estimate the parameters in the regression model, with the aim of determining how strong the influence of the independent variable is on the dependent variable (7).

The Application Of Dynamic Regression Analysis Models In Determining Factors Affecting The Economic Growth Of Small And Medium Enterprises (Smes) In Padangsidempuan City Using The Ordinary Least Square (Ols) Method, Lilis Saryani, et.al.

B. Economic Growth

In general, economic growth is defined as an increase in the ability of an economy to produce goods and services. Economic growth is one of the most important indicators in analyzing economic development in a country. Economic growth shows the extent to which economic activity will generate additional public income in a certain period (8). The economy is considered to be growing if all real services to the use of factors of production in a particular year are greater than in the previous year.

C. Economic Growth Factors

The main factor affecting the development of an economy is natural resources or land. Land as used in economics includes natural resources such as soil fertility, location and composition, forest wealth, minerals, climate, water sources, ocean resources, and so on. In economic growth, the availability of natural resources in abundance is important (9).

D. Ordinary Least Square (OLS)

The OLS (Ordinary Least Square) method is a regression method that minimizes the sum of squared errors. The parameter estimation method used is the OLS (Ordinary Least Square) method, which estimates the regression coefficient (β) by minimizing the error (10). The parameter estimator is as follows:

$$\hat{\beta} = (X^T X)^{-1} X^T y$$

Where β is a vector of estimated parameters of size $(p + 1) \times 1$, X is a matrix of predictor variables of size $n \times (p + 1)$ and y is a vector of observations of response variables of size $n \times 1$.

E. Conceptual Framework

This study aims to analyze what factors affect the economic growth of MSMEs in Padangsidempuan City and how much influence they have. In addition, this study also aims to apply a dynamic regression analysis model with the OLS method to test the relationship between the independent variable and the dependent variable. The conceptual framework of this research is as follows:

1. Independent variables, in this study are factors that affect the economic growth of MSMEs in Padangsidempuan City. These factors include: (a) investment, (b) human resources, (c) market access, (d) infrastructure, and (e) government policy.
3. The dependent variable, in this study, is the economic growth of MSMEs in Padangsidempuan City. MSME economic growth is measured using MSME sector GRDP growth.
4. Dynamic regression analysis model, dynamic is used in this study to examine the relationship between the independent variable and the dependent variable. The method used is Ordinary Least Square (OLS).
5. Data, the data used in this study are secondary data obtained from the Padangsidempuan City Statistics Agency. The data taken is MSME sector GRDP data and independent variables for the 2018-2022 period.

3. RESULTS AND DISCUSSION

A. Research Results

OLS in SMEs Economic Growth Analysis: Studies, such as those in Padangsidempuan City, utilized Ordinary Least Square (OLS) methods to comprehend factors influencing SMEs' economic growth. For instance, Nuari's analysis model involved multiple linear regression equations with the Error Correction Model method, emphasizing the significance of using OLS in understanding SMEs' economic dynamics 1. Additionally, Hamzah's research conducted multiple linear regression analysis using OLS, revealing that loan availability significantly affects SMEs' economic growth. Dynamic Regression Models for Economic Growth: Dynamic Regression (DR) models have been employed in economic growth studies. For instance, a study sought to determine the impact of the capital market on economic growth in Nigeria using annual

data from 1981 to 2010, showcasing the application of dynamic regression in understanding economic dynamics.

Comparison with Structural Equation Model (SEM): While OLS is widely used, other methods like the Structural Equation Model (SEM) with Partial Least Square (PLS) analysis technique have been employed in economic analyses. Studies, like one using SEM-PLS analysis, delve into inferential statistical results, offering a contrasting approach to comprehend economic growth factors. Quantitative Research Methods in SMEs Analysis: The application of quantitative research methods, as seen in Maksum's study involving 177 MSME actors in Padangsidempuan City, highlights the significance of data-driven analysis in understanding SMEs' economic growth. This research signifies the importance of employing empirical evidence in studying economic factors affecting SMEs.

Comprehensive Understanding of SMEs Growth: Collectively, these diverse methodologies underscore the multidimensional approach necessary to comprehend the factors influencing SMEs' economic growth. While OLS remains prevalent, the utilization of dynamic regression, SEM, and empirical studies showcases the need for a comprehensive understanding of various economic models to effectively determine and predict SMEs' growth dynamics. The structure and content of the table largely depend on the variables, coefficients, and statistical outputs obtained from the regression analysis conducted in the research.

However, here's a generalized example of how a table might look for regression analysis results:

Variables	Coefficients	Standard Error	t-value	p-value
Independent Var1	0.543	0.078	6.943	0.000
Independent Var2	-0.322	0.052	-6.188	0.000
Independent Var3	0.231	0.041	5.623	0.000

The actual table from the research would contain the specific variables (factors affecting SMEs' economic growth), their respective coefficients, standard errors, t-values, and p-values derived from the regression analysis. The table might also include additional statistical measures such as R-squared, F-statistics, and adjusted R-squared, depending on the analysis conducted in the research

4. CONCLUSION

Utilizing the Ordinary Least Square (OLS) method, numerous studies have delved into understanding the intricate factors impacting the economic growth of Small and Medium Enterprises (SMEs) in Padangsidempuan City. These studies applied quantitative research methods, analyzing a substantial sample size ranging from 177 MSME actors to broader economic growth models. Research conducted with a quantitative approach showcased significant variables influencing economic growth in the short and long term 2. Moreover, dynamic regression models, similar to those applied in determining the Gross Domestic Product (GDP) of Nigeria, sought to gauge the impact of various economic factors like the capital market on growth 3. Other methodologies, including Partial Least Square (PLS) and Structural Equation Modeling (SEM), have been utilized to comprehend economic phenomena, contributing valuable insights into the intricate relationship between SMEs and economic growth 4. These research endeavors have offered a comprehensive view of the economic dynamics in Padangsidempuan City, aiding policymakers, stakeholders, and researchers in making informed decisions to bolster SME growth and economic development in the region.

Acknowledgements

Researchers would like to express their gratitude to the Ministry of Education and Culture, DRPM, and LLDIKTI region 1 for financing the Novice Lecturer Research grant for the 2023 fiscal year 2023, with contract number 033 / LL1 / AL.04.03/2023, as well as UNIVERSITAS GRAHA NUSANTARA which has facilitated lecturers to carry out and participate in activities in the PDP scheme through BIMA.

REFERENCES

- [1] D. S. Mirza, "PENGARUH KEMISKINAN, PERTUMBUHAN EKONOMI, DAN BELANJA MODAL TERHADAP INDEKS PEMBANGUNAN MANUSIA DI JAWA TENGAH TAHUN 2006-2009," *Econ. Dev. Anal. J.*, vol. 1, no. 1, pp. 1-15, 2012, [Online]. Available: <http://journal.unnes.ac.id/sju/index.php/edaj>.
- [2] A. Winarti, "Analisis Pengaruh Pengeluaran Pemerintah Bidang Pendidikan, Kemiskinan, dan PDB Terhadap Indeks Pembangunan Manusia di Indonesia Periode 1992 - 2012," Semarang, 2015.
- [3] B. P. S. K. Padangsidimpuan, "Berita Resmi Statistik: Indeks Pembangunan Manusia Kota Padangsidimpuan Tahun 2018 No. 01/05/1277/Thn. I, 27 Mei 2019.," 2019.
- [4] P. Todaro, Michael and S. C. Smith, *Pembangunan Ekonomi di Dunia Ketiga, Kedelapan*. Jakarta: Erlangga, 2003.
- [5] Abdelina and L. Saryani, "ANALISIS FAKTOR KEMISKINAN DAN PERTUMBUHAN EKONOMI TERHADAP INDEKS PEMBANGUNAN MANUSIA (IPM) DI KOTA PADANGSIDIMPUAN," *J. Educ. Dev. Intitut Pendidik. Tapanuli Selatan*, vol. 8, no. 2, pp. 508-513, 2020.
- [6] A. Wardhana, B. Kharisma, and S. A. Noven, "Dinamika Penduduk Dan Pertumbuhan Ekonomi Di Indonesia," *Bul. Stud. Ekon.*, vol. 25, no. 1, p. 22, 2020, doi: 10.24843/bse.2020.v25.i01.p02.
- [7] Kemendikbud, "RENCANA INDUK RISET NASIONAL TAHUN 2017-2045 (Edisi 28 Pebruari 2017)," *Handb. Logist. Distrib.*, pp. 1-100, 2017, doi: 10.1201/9781482277098-12.
- [8] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta, 2018.
- [9] Creswell John, *Research Design Pendekatan Kualitatif, Kuantitatif dan Mixed*. Yogyakarta: Pustaka Belajar, 2010.
- [10] W. Wing Wahyu, *Analisis Ekonometrika dan Statistika dengan Eviews*, Edisi 4. Yogyakarta: UPP STIM YKPN, 2015.