



Effect of the COVID-19 pandemic on micro and small industry revenue in west Sumatra province, Indonesia

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ABSTRACT

Article History

Received: 25 June 2024

Revised: 23 September 2024

Accepted: 4 October 2024

Published: 14 October 2024

Keywords

COVID-19

Impact

Micro and small industry

Revenue

West Sumatra province.

This study looks into how the COVID-19 pandemic has affected the revenue of Indonesia's West Sumatra Province's micro and small industries (MSI). Ordinary least square analysis is used in the study methodology taking into account classical assumption tests for heteroscedasticity and multicollinearity. This research data is in the form of panel data from 2018 to 2020 covering 19 regencies and cities. The results show that the COVID-19 pandemic has had a negative and considerable effect on West Sumatra Province's revenue from MSI. The COVID-19 pandemic has impacted the decline in revenue for MSI. The government should actively provide subsidies and assistance to MSI in West Sumatra Province particularly during COVID-19. Implementing various supportive regulations can further ensure the sustainability of MSI.

Contribution/Originality: The contribution of this study is to investigate the impact of the COVID-19 pandemic on MSI revenue in West Sumatra Province because there is still relatively little and limited research analyzing the impact of the COVID-19 pandemic and the factors that determine MSI revenue especially in West Sumatra Province.

1. INTRODUCTION

The COVID-19 pandemic which has impacted the world since early 2020 has significantly affected various aspects of life including the economy (Belitski, Guenther, Kritikos, & Thurik, 2022; Fairlie, 2020; Gusti, Lukito, Satrianto, Marwan, & Prima, 2024; Milzam, Mahardika, & Amalia, 2020; Ngo & Duong, 2024). This has influenced nearly every country, both developed and developing, including Indonesia, namely the region of West Sumatra. Numerous interruptions to economic activity have been brought about by the COVID-19 pandemic including reduced demand, supply chain disruptions, social limitations etc. Social restrictions imposed to stop the transmission of viruses have caused a decline in activity in several commercial sectors such as commerce, tourism and transportation. The COVID-19 epidemic has disrupted global supply chains driving up the cost of both raw materials and completed goods. Many businesses have seen a drop in sales and profit as a result of the COVID-19 pandemic's impact on domestic and worldwide demand (Milzam et al., 2020; Ngo & Duong, 2024). Data from the

Central Bureau of Statistics (BPS) shows that Indonesia's economic growth in 2020 fell to -2.07 percent from the previous year (Statistik, 2020). On the other hand, West Sumatra Province as part of Indonesia itself also experienced an economic contraction in 2020 of -1.60 percent from the previous year.

This phenomenon is felt by Micro and Small Industry (MSI) players in West Sumatra Province. The impact of COVID-19 is also felt by MSI which is the backbone of the Indonesian economy. MSI players face various challenges that have a significant impact on their operations and business continuity. According to BPS West Sumatra Province data in 2020, as many as 74.41 thousand MSI businesses stated that the business they were running was affected by the pandemic (79 percent). This impact occurs in all industrial groups with quite varying percentage sizes. However, in general, a higher number of MSI enterprises reported being impacted by the epidemic compared to those who indicated it did not affect them (21 percent) (see Figure 1).

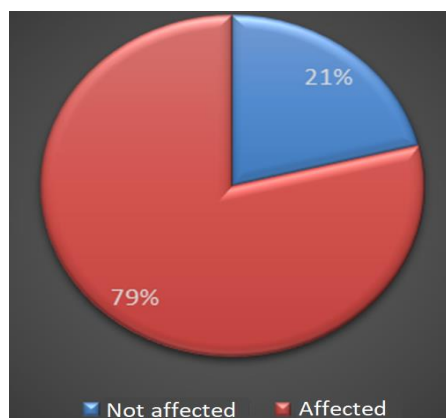


Figure 1. Percentage of the number of impacted and unimpacted MSI COVID-19 pandemic in West Sumatra province.

Source: Statistik (2020).

The epidemic has had a wide range of effects on MSI enterprises. However, the major effects were a decline in demand or sales of products and services (58.14 percent), a rise in the cost of raw materials (15.18 percent) and a 12.35 percent delay in customer payments (see Figure 2A). Changes in people's behavior during the pandemic are one of the causes of the drop in sales of products and services. People are more selective in allocating expenses when frequent changes occur due to the adoption of different policies. Other than that, workers' attendance was lower (2.43 percent) and there was a shortage of raw materials (10.25 percent). The MSI revenue in West Sumatra Province decreased as a result of this scenario in the end between 2019 and 2020. All districts and cities together had average MSI revenue of Indonesian Rupiah (IDR) of 534,061,556 in 2019 (see Figure 2B). This study attempts to investigate how the COVID-19 epidemic has affected MSI's business revenue in West Sumatra Province based on these occurrences and situations. Numerous studies have already looked into how the COVID-19 epidemic has affected small and micro companies (Fourqoniah & Aransyah, 2021; Harel, 2021; Shafi, Liu, & Ren, 2020; Ssenyonga, 2021). However, there is still limited research analyzing the impact of the COVID-19 pandemic and the factors that determine MSI revenue (Milzam et al., 2020) especially in West Sumatra Province. This is important to know as a basis for policymaking to anticipate the impact of the pandemic in West Sumatra Province in the future.

This research provides a deeper understanding of how the COVID-19 pandemic affects the revenue of MSI in West Sumatra Province based on these facts and empirical findings. This research also identifies the determinants of MSI revenue, including capital, loans, technology, labor, working hours, worker status, education, training, age and gender. This research offers an analytical model that can be used to understand the dynamics of development and regional economics especially in the context of the impact of a global crisis such as a pandemic. The results of this research can be used by the West Sumatra Provincial government to map and adopt more effective policies for increasing MSI revenue in the region.

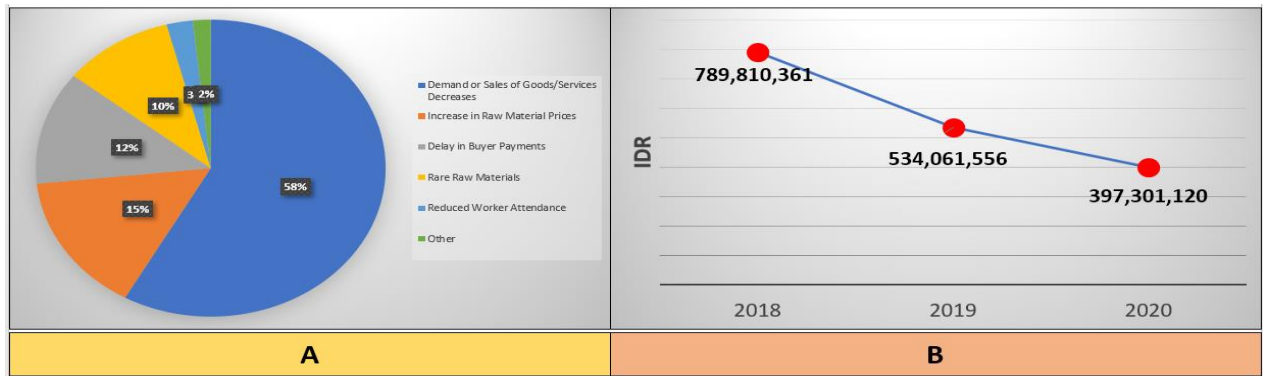


Figure 2. The impact of the COVID-19 pandemic on MSI in West Sumatra province.

Source: Statistik (2018), Statistik (2019) and Statistik (2020).

Therefore, the question in this research is to analyze the impact of the COVID-19 pandemic on the revenue of MSI in West Sumatra Province. And what are the most dominant and least dominant factors influencing MSI revenue in districts and cities in West Sumatra Province? To answer this, the structure of this paper consists of an introduction, literature review, methodology, results and discussion as well as conclusions containing implications, limitations and suggestions for future researchers. This research will provide a comprehensive picture of the impact of the COVID-19 pandemic and the determinants of micro and small industry revenue in West Sumatra Province as well as offer relevant policy recommendations.

2. LITERATURE REVIEW

2.1. Revenue

In microeconomic theory, revenue is defined as the total receipts from sales produced. The formula for determining this revenue was as follows Browning and Zupan (2020), Dwivedi (2018) and Pindyck (2018):

$$TR = P \cdot Q \tag{1}$$

Where

TR = Revenue.

P = Price.

Q = Production.

So, the determining factors of revenue are price and production.

If it is assumed that prices are constant, then revenue is determined by production.

$$TR = P^* \cdot Q \tag{2}$$

$$TR = f(Q) \tag{3}$$

In production theory, the production of goods and services is influenced by capital (K) and labor (L). So the formula for production was as follows (Hayashi, 2021):

$$Q = f(K, L) \tag{4}$$

Where

Q = Production.

K = Capital.

L = Labor.

K is all input factors that determine the amount of production other than labor (humans). Meanwhile, L is all input factors related to labor. Based on Equations 3 and 4, K and L can influence revenue either directly or indirectly. Therefore, the revenue formula is as follows:

$$TR = f(Q) = f(K, L) \tag{5}$$

From Equations 3, 4 and 5, it is identified that the factors that determine revenue are production, capital and labor assuming constant prices. If K is an input factor that influences revenue other than labor, then K in this research is capital, loans and technology that influence MSI revenue. Meanwhile, if L is an input factor related to labor, then L in this study is quantity, labor, working hours, worker status, education, training, age and gender which influence MSI revenue.

2.2. Previous Research

Numerous earlier academics have researched the factors that influence revenue in micro, small, and medium-sized businesses. These studies concluded that several factors have a significant impact on a company's revenue across different nations including gender, marketing methods, worker status, age, education and training.

Researchers worldwide have also looked closely at how the COVID-19 pandemic affected the earnings of micro and small businesses particularly once the virus began to spread to other nations. Micro and small companies in Pakistan, Kenya, Ethiopia, Bangladesh, and Nigeria have seen a decrease in revenue as a result of the COVID-19 epidemic based on the results of these studies (Alam, Thakur, & Islam, 2024; Aminu & Mohd Shariff, 2015; Kassa, 2021; Shafi et al., 2020; Song, Yang, & Tao, 2020). Additionally, the COVID-19 epidemic has destroyed small and micro companies in developed and developing countries. According to Yadav, Tripathi, and Tripathi (2022) technological innovation channels are able to increase production efficiency and distribution scale in the long-term making the revenue level of MSI increase. The massive use of technology explores financial resources by relying on financing from financial institutions by offering soft loan schemes so that MSI focus on improving organizational structures and human resource management. Trunk and Birkel (2022) found evidence that a skilled workforce can spur the progress of MSI through a system that works professionally in an organization that is based on integration and correct decision-making. An essential component of MSI's sustainability is its focused and maximal product distribution which has been made possible by the existence of a professional team. Song et al. (2020) explain in detail how COVID-19 affects MSI. The study's findings demonstrate that practically all MSI suffered during the COVID-19 epidemic particularly in terms of revenue. Therefore, recommendations for fast and effective adaptation during COVID-19 are vital for MSI for the continuity of production and the need for human resources capable of maintaining MSI production during the COVID-19 pandemic. For this reason, risk management for MSI is considered to have a major role in improving MSI performance in the short-term so that opportunities for market development will always exist in the business environment. MSI that continue to survive changes in the business cycle have responded to the challenges of achieving progress. The workforce factor is an important aspect in the development of MSI. Studies show that working hours can have a significant impact on MSI production which leads to revenue levels. In addition, gender equality in the MSI environment has made full efforts to reward each worker with a workload that is appropriate to each worker's gender so that MSI profit targets can be achieved (Ssenyonga, 2021). The COVID-19 pandemic's overall effects have decreased MSI's access to funding. Before the pandemic, the capital distribution process was accelerated in a highly effective way but after the pandemic occurred, financing was unable to encourage technological innovation and recruit good quality workers causing SME production to be hampered as well as MSI revenue dropping during the pandemic (Mishrif & Khan, 2023). MSI competition during the pandemic has become a widely researched topic.

There are many MSI that have survived, but there are also quite a few that have not been able to survive in maintaining competition, optimizing profits and effective marketing that can increase MSI's revenue. The level of soft loans is one solution to facing challenges during the crisis due to COVID-19 by including human resources who can manage strategies for MSI with adaptive policies (Kassa, 2021). Huy and Phuc (2023) examined how COVID-19 affected MSI. The study's findings indicate that a large number of employees had been laid off but some of them work in the MSI sector on a seasonal or irregular basis so this condition has a short-term impact on MSI revenue. In addition, the number of workers spread across MSI is a particular concern with the small number of

highly educated workers. MSI has to provide special training for these workers to increase production levels. Guo, Yang, Huang and Guo (2020) emphasized that economic development comes from MSI that have a clear priority scale. Growing MSI is able to absorb a lot of labor on a local and national scale by providing employment opportunities that can change the standard of living for the better. The social dimension can change as economic development continues to run optimally by prioritizing labor intensive activities so that MSI does not lack the number of workers needed. However, research related to the determinants of micro and small industry revenue and the impact of the COVID-19 pandemic on micro and small industry revenue has mostly been carried out by collecting primary data from the researchers themselves. These researchers determined research questionnaire indicators according to their respective criteria. There is a lot of diversity in indicators making research results quite varied. From the theory and literature survey regarding the revenue of MSI above, this study attempts to integrate previous research by examining the effects of the COVID-19 epidemic and the variables that affect the revenue of micro and small businesses particularly in West Sumatra Province. Because all of the data used in this study comes from a survey that BPS conducted and published as the book Profile of MSI in West Sumatra Province from 2018 to 2020, it employs a more reliable research tool.

It is envisaged that by employing information from the book Profile of MSI in West Sumatra Province, the research findings will be considerably more valid and representative enabling a thorough mapping of the state of MSI in West Sumatra Province. This data can undoubtedly improve the accuracy of empirical test results making them suitable for use as a foundation for policymaking.

3. METHODOLOGY

3.1. Data

The data in this research is secondary data sourced from BPS West Sumatra Province through the book profile of MSI of West Sumatra Province (Statistik, 2018, 2019, 2020). This research data began in 2018-2020 in 19 districts and cities because survey data related to MSI in West Sumatra Province was only available from 2018-2020. The amount of data in the study is 57.

3.2. Variables

The operational definition of every variable used in this study is provided in Table 1 to avoid misunderstandings regarding the definition and units used for each variable.

Table 1. Operational definition of variables.

No.	Variable names	Operational definition	Unit
1	Revenue (Y)	Revenue obtained from production results.	Rupiah
2	Pandemic (X ₁)	Impact of the COVID-19 pandemic. Category 0 = < 2020 year, 1 = ≥ 2020.	Dummy
3	Capital (X ₂)	Percentage of MSI with its own capital sources compared to loans to other parties.	Percent
4	Loan (X ₃)	Many MSI borrow from banks.	Unit
5	Technology (X ₄)	Many MSI market their products with the help of the internet.	Unit
6	Labor (X ₅)	Number of workers who directly work or are involved in the production process.	Person
7	Working hours (X ₆)	Average working hours in a day.	Hours
8	Worker status (X ₇)	Percentage of workers who are paid and who are not paid.	Percent
9	Education (X ₈)	Percentage of education level of MSI entrepreneurs who graduated from college and who did not graduate from college.	Percent
10	Training (X ₉)	Many MSI take part in managerial, skills, marketing and other training.	Unit
11	Age (X ₁₀)	Age percentage of MSI entrepreneurs who are productive and those who are not productive.	Percent
12	Gender (X ₁₁)	Gender percentage of male and female MSI entrepreneurs	Percent

3.3. Research Design

Ordinary Least Squares (OLS) is the data analysis technique used in this research to address the formulation of the problem. OLS is a statistical technique used to understand the relationship between two or more independent variables (predictors) and one dependent variable (response). This OLS method is used because this research looks at the influence of the main variable (the impact of COVID-19) and control variables on the acceptance of MSI which are still relatively limited in use by previous researchers. This OLS equation takes the Equations 6.

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \beta_9 X_{9it} + \beta_{10} X_{10it} + \beta_{11} X_{11it} + \mu_{it} \tag{6}$$

Where

Y = Revenue

X1 = Pandemic

X2 = Capital

X3 = Loan

X4 = Technology

X5 = Labor

X6 = Working hours

X7 = Worker status

X8 = Education X9 = Training X10 = Age X11 = Gender

β0 = Intercept

β1-β11= Regression coefficient

μ = Error term

In this study, Fixed Effect Model (FEM), Random Effect Model (REM) and Lagrange Multiplier (LM) tests are conducted to select the most appropriate model for panel data analysis and to ensure that the results obtained are valid and reliable.

After that, classical assumption tests are performed following the multiple linear regression analysis to ensure that the estimates meet the Best Linear Unbiased Estimator (BLUE) assumptions. Two examples of these traditional tests are heteroscedasticity and multicollinearity.

4. RESULTS AND DISCUSSIONS

4.1. Panel Data Model Selection Test

4.1.1. Test Chow

The fixed effect model (FEM) and the common effect model (CEM) are compared to determine which model is superior using the Chow test. If the cross-section probability F is greater than 0.05, the CEM model is used. However, if the cross-section probability F is less than 0.05, the FEM model is chosen. According to Table 2, the cross-section probability is 0.2923. Since this probability is greater than 0.05, the CEM model would typically be chosen. However, the FEM model was selected because the cross-section probability F was 0.01 less than 0.05. Consequently, the Hausman test is conducted as the next step.

Table 2. Chow test results.

Redundant fixed effects tests			
Equation: Untitled			
Cross-section fixed effects test			
Effects test	Statistics	df	Prob.
Cross-section F	1.25	-18.3	0.29
Chi-square cross-section	34.6	18	0.01

4.1.2. Hausman Test

The Hausman test is used to determine whether the random effect model (REM) or the fixed effect model (FEM) is more appropriate. The FEM is chosen if the random cross-section probability is less than 0.05 while the REM is selected if the probability value is greater than 0.05. The REM was chosen because the random cross-section probability value is 0.6557 indicating no statistical significance ($p > 0.05$) based on the Hausman test results shown in Table 3.

Table 3. Hausman test results.

Correlated random effects: Hausman test			
Equation: Untitled			
Cross-section random effects test			
Test summary	Chi-sq. statistics	Chi-sq. df	Prob.
Random cross-section	8.63	11	0.66

4.1.3. Lagrange Multiplier (LM) Test

The LM test is used to evaluate or select between REM and CEM as the best model. The model used is CEM if the Breusch-Pagan probability value is greater than 0.05 and REM if the Breusch-Pagan probability value is less than 0.05. Table 4's Breusch-Pagan probability value of 0.2035 indicated no statistical significance ($p > 0.05$) which indicates that the CEM model was selected.

Table 4. Lagrange multiplier test results.

Lagrange multiplier tests for random effects			
Null hypothesis: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
Breusch-Pagan	Test hypothesis		
	Cross-section	Time	Both
	0.03	1.58	1.62
-0.85	-0.21	-0.20	

4.2. Test Analysis Prerequisites

The next step is to do the traditional assumption test to make sure the regression model satisfies the blue assumption which is as follows:

4.3. Heteroscedasticity Test

The heteroscedasticity test is used to determine whether the residuals of one observation differ in variance from those of another observation in a regression model. Homoscedasticity occurs when the variance is the same, but heteroscedasticity occurs when the variance varies. A good regression model is one in which heteroscedasticity does not exist.

Heteroscedasticity testing can be carried out using the Glejser test with the following hypothesis:

H_0 : Heteroscedasticity does not occur.

H_a : Heteroscedasticity occurs.

H_0 is rejected if the likelihood is less than 0.05 indicating a heteroscedasticity issue. On the other hand, H_0 is accepted and there is no heteroscedasticity issue if the probability is greater than 0.05. Three independent variables X_4 , X_{10} , and X_{11} show no statistical significance ($p > 0.05$) based on the heteroscedasticity test results. Therefore, it can be concluded that this panel regression model has heteroscedasticity issues that need to be resolved.

One method used is to carry out model transformation to overcome the problem of heteroscedasticity in this research. Model transformation is carried out by log-transforming the variables in the regression equation. This logarithm is carried out on variables whose units are not percent while variables whose units are percent are not subjected to a logarithmic process. Table 5 displays the heteroscedasticity test results following the model change. It is evident from this table that each variable has a probability value larger than 0.05. This means that there are no heteroscedasticity issues with the regression model used in this investigation.

Table 5. Heteroscedasticity test results after transformation.

Variables	Coefficient	Std. error	t-statistics	Prob.
C	1.94	0.95	2.03	0.05
X ₁	0.03	0.04	0.72	0.48
X ₂	0.02	0.07	0.27	0.79
LOG(X ₃)	-0.08	0.05	-1.49	0.15
LOG(X ₄)	0.02	0.02	0.78	0.44
LOG(X ₅)	-0.15	0.12	-1.24	0.23
LOG(X ₆)	-0.17	0.28	-0.58	0.56
X ₇	0.31	0.36	0.87	0.39
X ₈	0.12	0.12	1.01	0.32
LOG(X ₉)	0.22	0.11	2.01	0.99
X ₁₀	0.15	0.09	1.69	0.10
X ₁₁	0.17	0.61	0.28	0.78
Effects specification				
Cross-section fixed (dummy variables)				
MSE root	0.07	R-squared		0.83
Mean dependent var	0.19	Adjusted R-squared		0.65
SD dependent var	0.18	SE of regression		0.11
Akaike info criterion	-1.36	Sum squared reside		0.30
Schwarz criterion	-0.29	Log- likelihood		6.88
Hannan-Quinn criterion	-0.95	F-statistic		4.60
Durbin-Watson stat	2.61	Prob(F-statistic)		0.00

4.4. Multicollinearity Test

An assessment of the relationship between variables is the multicollinearity test. To determine the correlation between independent variables, use the multicollinearity test. There cannot be a strong linear relationship between the independent variables if there is no multicollinearity among them. The correlation matrix method was applied in this study to ascertain the relationship between the independent variables. A measure of multicollinearity can be obtained by looking at each independent variable's correlation coefficient. Multicollinearity is demonstrated when each variable's coefficient is more than 0.8. On the other hand, there is no multicollinearity issue if each variable's coefficient is less than 0.8.

Table 6. Multicollinearity test results.

Items	X ₁	X ₂	LOG(X ₃)	LOG(X ₄)	LOG(X ₅)	LOG(X ₆)	X ₇	X ₈	LOG(X ₉)	X ₁₀	X ₁₁
X ₁	1.00	0.20	-0.14	0.33	-0.03	-0.08	0.00	-0.05	-0.17	-0.05	0.01
X ₂	0.20	1.00	-0.49	0.12	0.03	-0.21	-0.19	0.06	-0.01	-0.21	-0.25
LOG(X ₃)	-0.14	-0.49	1.00	0.40	0.72	0.00	0.18	0.56	0.34	0.04	0.00
LOG(X ₄)	0.33	0.12	0.40	1.00	0.54	-0.04	0.15	0.37	0.30	-0.03	-0.33
LOG(X ₅)	-0.03	0.03	0.72	0.54	1.00	-0.08	0.00	0.34	0.37	-0.07	-0.36
LOG(X ₆)	-0.08	-0.21	0.00	-0.04	-0.08	1.00	0.09	-0.09	-0.04	0.31	0.18
X ₇	0.00	-0.19	0.18	0.15	0.00	0.09	1.00	-0.12	0.29	-0.01	0.34
X ₈	-0.05	0.06	0.56	0.37	0.34	-0.09	-0.12	1.00	0.29	-0.12	-0.30
LOG(X ₉)	-0.17	-0.01	0.34	0.30	0.37	-0.04	0.29	0.29	1.00	-0.31	-0.19
X ₁₀	-0.05	-0.21	0.04	-0.03	-0.07	0.31	-0.01	-0.12	-0.31	1.00	0.08
X ₁₁	0.01	-0.25	0.00	-0.33	-0.36	0.18	0.34	-0.30	-0.19	0.08	1.00

Similar to the preceding heteroscedasticity test, the multicollinearity test in this study was conducted on variables that had undergone transformation. Table 6 demonstrates that all correlation coefficient values between independent variables are less than or equal to 0.8. Because of this, it can be said that there are no multicollinearity issues with this study.

4.5. Panel Regression Test

This test examines the impact of the independent variable on the dependent variable which is a cross-sectional and time-series combination of data. The extent to which the COVID-19 epidemic, capital, loans, technology, labor, working hours, worker status, education, training, age, and gender have an impact on MSI revenue in West Sumatra Province districts and cities may be ascertained from the research findings.

The following panel regression equation was produced using EViews secondary data processing results shown in Equations 7:

$$Y = 11.8 - 0.39 X_1^{**} + 0.09 X_2^{**} + 0.11 \text{Log } X_3 + 0.04 \text{Log } X_4 + 0.87 \text{Log } X_5^{***} + 0.45 \text{Log } X_6^{***} - 0.03 \text{Log } X_7^{**} + 0.23 \text{Log } X_8 + 0.06 \text{Log } X_9^{***} + 0.01 \text{Log } X_{10} + 0.02 \text{Log } X_{11} \quad (7)$$

Table 7. Common effect model regression test results.

Variables	Coefficient	Std. error	t-statistics	Prob.
C	11.83	1.58	7.48	0.00
X ₁	-0.39**	0.17	-2.38	0.02
X ₂	0.09**	0.04	2.46	0.02
LOG(X ₃)	0.11	0.14	0.84	0.41
LOG(X ₄)	0.04	0.05	0.69	0.49
LOG(X ₅)	0.87**	0.17	5.15	0.00
LOG(X ₆)	0.45***	0.11	4.12	0.00
X ₇	-0.03**	0.01	-2.39	0.02
X ₈	0.23	0.33	0.70	0.49
LOG(X ₉)	0.06***	0.02	3.62	0.00
X ₁₀	0.01	0.00	1.92	0.06
X ₁₁	0.02	0.02	0.98	0.33
MSE root	0.35	R-squared		0.85
Mean dependent var	1.98	Adjusted R-squared		0.82
SD dependent var	0.94	SE of regression		0.40
Akaike info criterion	1.18	Sum squared resid		7.16
Schwarz criterion	1.62	Log-likelihood		-2.18
Hannan-Quinn Criterion	1.35	F-statistic		2.39
Durbin-Watson stat	1.63	Prob(F-statistic)		0.00

*Note: Significance levels are marked as follows: ** probability <0.05, *** probability <0.01.

Thus, if the COVID-19 pandemic variable, capital, loans, technology, labor, working hours, worker status, education, training, age and gender are taken into consideration, the estimation results of the MSI revenue equation above show that in the event that none exists, MSI's revenue in the West Sumatra Province is worth 11.83 percent. The COVID-19 pandemic has a negative impact on MSI revenue in West Sumatra Province with an estimated coefficient of -0.393266. This indicates that, if all other factors remain fixed, MSI revenue in West Sumatra Province will fall by 0.393 percent if the COVID-19 epidemic increases by one unit (ceteris paribus).

4.6. Coefficient of Determination

The purpose of the coefficient value is to ascertain the potential influence of the independent variable on the dependent variable which is expressed as a percentage. 0.854087 is the R squared value that was determined based on the outcomes of the tests that were conducted. This demonstrates that the COVID-19 pandemic, capital, loans, technology, labor, working hours, worker status, education, training, age and gender all contribute variable

amounts to MSI revenue in West Sumatra Province accounting for 85.41 percent of the total. Other variables not included in the MSI revenue equation model in West Sumatra Province are responsible for the remaining 14.39 percent.

4.7. Hypothesis Test

4.7.1. Probability Test

The purpose of this test is to ascertain how the independent variable affects the dependent variable. The conclusion that the independent variable partially influences the dependent variable is supported if the probability value is less than or equal to α 0.05 leading to the rejection of H_0 and the acceptance of H_a . In contrast, if the probability value is less than or equal to α 0.05, then H_a is rejected and H_0 is allowed indicating that there is only a partial lack of substantial influence from the independent variable on the dependent variable.

Table 7 displays the probability value of each variable based on the estimation findings. The first finding shows that the COVID-19 variable has a probability value of 0.0213. H_a is accepted and H_0 is rejected because this probability value is smaller than $\alpha = 0.05$. Therefore, it can be concluded that the COVID-19 outbreak has had a major impact on MSI's revenue in West Sumatra Province.

Furthermore, the variables capital, labor, working hours, worker status and training as control variables have a positive and significant influence on MSI revenue because the probability less than $\alpha = 0.05$. However, loans, technology, education, age and gender showed no statistical significance.

4.7.2. F-Statistics Test

F-statistical testing to empirically prove the effect of the COVID-19 pandemic, capital, loans, technology, labor, working hours, worker status, education, training, age and gender on MSI revenue in West Sumatra Province jointly or simultaneously.

It is evident from Table 7 that the F-statistic value is 23.94573. With degrees of freedom (degrees of freedom 1) $k - 1$, where k is the number of variables or $11 - 1 = 10$ and (degrees of freedom 2) $n - k$ where n is the amount of data and k is the number variable or $84 - 11 = 73$, you can get the f-table by searching for $\alpha = 0.050$. The resultant F-table is 0.3834 with a significance test of 0.050. 0.000000 is the F-Statistics probability value which is less than the 0.05 error rate. Because the probability of F (0.0000) < 0.05 and the value of F-Statistics > F-table (23.94573 > 0.3834), it can be concluded below which means that the independent variables COVID-19 pandemic, capital, loans, technology, labor, working hours, worker status, education, training, age and gender together have a significant effect on MSI revenue in West Sumatra Province.

4.8. Discussion

4.8.1. The Influence of the COVID-19 Pandemic on MSI's Revenue in West Sumatra Province

According to Table 7's panel regression data processing results, West Sumatra Province's MSI revenue is significantly impacted by the COVID-19 pandemic and has a negative estimated coefficient direction. This indicates that MSI's revenue in West Sumatra Province has decreased as a result of the COVID-19 epidemic. This state of affairs has resulted from the COVID-19 pandemic restricting people's movements and activities. To stop the virus from spreading, measures including social distancing, transit restrictions and the closure of busy areas have been taken. Due to this circumstance, there is less public demand for products and services, particularly for activities that call for human presence in the area, which makes the economic environment less favorable. Naturally, there is a negative effect on sales in this scenario. Figure 2's data from BPS indicates that aside from rising raw material costs, longer payment terms for buyers, and lower worker attendance, the biggest influence on MSI's operations is a decline in demand or sales of both products and services. The fall in sales or demand for goods and services was cited by 58 percent of MSI business participants as having an impact on them. Overall, Figure 1's survey of MSI

business actors reveals that 79 percent of them were impacted by the COVID-19 epidemic. This indicates that the West Sumatra Province's MSI business players' revenue-generating operations have been significantly impacted by the COVID-19 outbreak. The results of this research are in accordance with previous research that examined the impact of COVID-19 on community businesses. The COVID-19 pandemic has caused a decrease in company activity and resulted in a decrease in revenue (Belitski et al., 2022; Ngo & Duong, 2024; Shafi et al., 2020).

4.8.2. The Influence of Capital on MSI Revenue in West Sumatra Province

It is evident from the data processing results that capital significantly influences MSI's revenue in the West Sumatra Province. The direction of capital's influence on MSI revenue in the West Sumatra Province is positive with an estimated coefficient of 0.089037. Accordingly, MSI revenue in West Sumatra Province will increase by 0.089037 percent (*ceteris paribus*) if capital increases by one unit. The primary resource needed for a company's activity is capital. Business operations won't function well without capital. Without capital, all commercial operations will be disrupted. Capital might take the shape of cash, manufacturing equipment, corporate premises or other financial resources. With adequate capital, production activities will be able to run well, the business will be able to develop and marketing will become broader so that it will have an impact on increasing sales. Increased sales will later be able to bring in increased revenue for the business. Thus, capital has a positive impact on increasing MSI's revenue in West Sumatra Province. The results of this research are supported by several previous research results such as Agustin and Satrianto (2023); Khanzode, Sarma, Mangla, and Yuan (2021); Storey (2016) and Suminah, Suwanto, Sugihardjo, Anantanyu, and Padmaningrum (2022). This research concludes that capital can have a positive impact on the revenue of micro and small businesses. The existence of capital contributes to business continuity in MSI.

4.8.3. The Effect of Loans on MSI Revenue in West Sumatra Province

According to Table 7's model estimation results, loans have no discernible impact on MSI revenue in West Sumatra Province because many MSI players do not want to take out these loans especially in banks, and even admit that it is difficult to make loans. There are many reasons why MSI actors do not make loans, including no interest, difficult requirements, no collateral, high interest rates, not knowing the procedures, proposals are often rejected and others. Based on survey results from BPS (Statistik, 2018, 2019, 2020), the reason why MSI did not take out a loan was because 63.56 percent of MSI players stated that they were not interested, 13.26 percent stated that the requirements were difficult, 10.90 percent stated that there was no collateral and 6.66 percent stated that the interest rate was high. Meanwhile, for reasons of not knowing the procedures and proposals, 4.84 percent and 0.78 percent were rejected respectively. Not being interested is the main factor in MSI actors not making loans to banks. It can be seen that during the research period, few MSI players took out loans from this condition. Their source of capital mainly comes from their capital so they do not take out loans. With or without loans, MSI actors in West Sumatra Province will continue to operate as long as there is capital to run the business. Thus, the loan has no impact on MSI's sales and revenue in West Sumatra Province.

The research results are not supported by previous research by Aminu and Mohd Shariff (2015), Jones, Borgman, and Ulusoy (2015), Khanzode et al. (2021) and Pérez-Gómez, Arbelo-Pérez, and Arbelo (2018). Previous research found that loans have an impact on the revenue of MSI.

4.8.4. The Influence of Technology on MSI Revenue in West Sumatra Province

The study's findings indicate that technology has little bearing on MSI revenue in the province of West Sumatra because there are still very few MSI players who use internet technology for their business activities such as marketing, sales, purchasing raw materials and other business activities. According to BPS data, it was recorded that in 2018 only 8 percent of MSI business actors used technology for their business activities. In 2019, it rises to 9

percent and in 2020 it rose to 20 percent (due to pandemic activities so internet use increased for marketing). However, the use of this technology, especially the internet in the business activities of MSI actors can still be said to be far from what it should be. This means that more than 80 percent of MSI players do not use technology for their business activities. The results of this study are not supported by Akpan, Udoh, and Adebisi (2022), AlBar and Hoque (2019) and Chatterjee and Kar (2020) which conclude that technology has a positive impact on MSI in various countries. The use of technology in business activities increases business turnover thereby increasing MSI's revenue.

4.8.5. The Influence of Labor on MSI Revenue in West Sumatra Province

According to study findings, labor significantly and favorably affects MSI revenue in the West Sumatra Province. The direction of labor's influence on MSI revenue in West Sumatra Province is positive with an estimated coefficient of 0.873243. Accordingly, MSI revenue in West Sumatra Province will rise by 0.873243 percent if labor use grows by 1 percent (*ceteris paribus*). Labor has a significant influence because labor is one of the main inputs for MSI's business activities. The presence of the workforce greatly contributes to MSI's business activities. More than 90 percent especially in micro industries, the workforce plays almost 100 percent of their business activities. Workers are seen buying raw materials; processing, packaging, marketing, recording transactions etc. This means that micro-entrepreneurs become the sole players in this business. The same thing happens in almost all small businesses. Labor is also a mainstay for them in business activities. Few of them use capital to support business activities. The results of this study are in line with the findings of Agustin and Satrianto (2023), Aminu and Mohd Shariff (2015), Pérez-Gómez et al. (2018), Shibia and Barako (2017) and Suminah et al. (2022) which concluded that the workforce made a positive contribution to increasing MSI's business performance and revenue.

4.8.6. The Influence of Working Hours on MSI Revenue in West Sumatra Province

In West Sumatra Province, working hours have a major and favorable impact on MSI revenue in addition to the workforce's presence. Workers are more productive in generating products and services when they work longer hours. Longer workdays will boost productivity among employees in terms of goods and services. Naturally, this will result in a greater supply of these products and services. This finding is supported by the compatibility between the working hours of MSI actors and the applicable regulations, namely Law Number 11 of 2020 concerning job creation (job creation law). In these regulations, it is stated that working hours in a day are 7 hours. If you look at the survey conducted by BPS West Sumatra Province, MSI's working hours have reached 7 hours a day. This shows that the working hours of MSI business actors are in accordance with applicable regulations.

The results of this study are in line with the findings of Agustin and Satrianto (2023), Aminu and Mohd Shariff (2015), Pérez-Gómez et al. (2018), Shibia and Barako (2017) and Suminah et al. (2022) which concluded that increasing working hours had a good impact on increasing MSI's business performance and revenue.

4.8.7. The Influence of Worker Status on MSI Revenue in West Sumatra Province

In West Sumatra Province, worker status significantly increases MSI revenue. The direction of influence of worker status on MSI revenue in West Sumatra Province is negative with an estimated value of -0.03395. This indicates that MSI revenue in West Sumatra Province will drop by 0.033949 percent (*ceteris paribus*), if worker status grows (more is paid) by 1 percent. This means that the more workers who are paid compared to the workers who are not paid, the more MSI's revenue will increase because paid workers will have higher responsibilities compared to unpaid workers. This high level of responsibility will be accompanied by higher productivity. Responsibility accompanied by high productivity will be able to increase production capacity to increase MSI's turnover. Increasing turnover will be able to bring in increased revenue for MSI. On the other hand, if the worker is not paid, the worker will not be able to be held responsible. The results of this study are in line with the findings of

Agustin and Satrianto (2023), Aminu and Mohd Shariff (2015), Pérez-Gómez et al. (2018), Shibia and Barako (2017) and Suminah et al. (2022) which concluded that improving worker status had a good and positive impact on increasing MSI's business activities and revenue.

4.8.8. The Influence of Education on MSI Revenue in West Sumatra Province

An individual's perspective, behavior and ability to make decisions will all be impacted by their level of education. Higher education correlates with improved decision-making especially in business management. However, education does not have a significant effect on MSI revenue in West Sumatra Province because the education level of MSI perpetrators in West Sumatra Province is still relatively low. According to Table 7, on average, only 8 percent of MSI perpetrators have completed higher education, namely diplomas and bachelor degrees when compared to all levels of education. In other words, more than 90 percent of MSI perpetrators' education in West Sumatra Province only finished high school or below, some even did not finish elementary school. Many West Sumatra Province MSIs seek business knowledge only from their experience.

The results of this study are not supported by the findings of Agustin and Satrianto (2023), Aminu and Mohd Shariff (2015); Panda (2015); Pérez-Gómez et al. (2018), Shibia and Barako (2017) and Storey (2016) which show that education has a positive impact on increasing MSI's business turnover and MSI's revenue.

4.8.9. The Effect of Training on MSI Revenue in West Sumatra Province

In the West Sumatra Province, training significantly boosts MSI's earnings. The computed coefficient of 0.056297 indicates a positive direction of influence between training and MSI revenue in West Sumatra Province. This indicates that MSI revenue in West Sumatra Province will grow by 0.056297 percent (*ceteris paribus*), if the amount of training attended increases by 1 percent. The existence of training has been proven to have an impact on MSI's business because with training MSI actors say they become more knowledgeable about business activities. The training includes managerial skills related to business management, production techniques, marketing, finance and others. This training has increased the knowledge, skills and abilities of MSI players in running their businesses. The results of this study are in line with Aminu and Mohd Shariff (2015), Chatterjee and Kar (2020), Panda (2015), Shibia and Barako (2017) and Storey (2016) which concluded that training had a positive impact on improving the performance of MSI actors.

4.8.10. The Influence of Age on MSI Revenue in West Sumatra Province

In West Sumatra Province, age has no discernible impact on MSI revenue. Whether the age of MSI perpetrators is productive (15 – 64 years) or unproductive (< 15 years and > 64 years) has been proven to have no impact on the rise and fall of MSI revenue in West Sumatra Province. Even though an individual's age is productive, it does not guarantee that they have good managerial skills in managing a business. Similarly, those who are not productive do not necessarily mean they cannot manage a business as long as they have good motivation and a high willingness to learn. Even though they are no longer productive as long as they have experience and good managerial skills, their revenue will increase. The results of this study are not supported by the research of Aminu and Mohd Shariff (2015), Chatterjee and Kar (2020), Panda (2015), Shibia and Barako (2017) and Storey (2016) which concluded that increasing age had a positive effect on improving the performance of MSI actors.

4.8.11. The Influence of Gender on MSI Revenue in West Sumatra Province

In West Sumatra Province, gender has little bearing on MSI earnings. This means that neither men nor women determine MSI revenue in West Sumatra Province. Even though the gender of many MSI perpetrators is male, it has been proven that it does not determine the increase or decrease in MSI revenue. Even though women

have good managerial skills, they can have an impact on increasing or decreasing revenue because there are also many MSI businesses led by women who can manage the business.

The results of this study are not supported by the research of Aminu and Mohd Shariff (2015), Chatterjee and Kar (2020), Panda (2015), Shibia and Barako (2017) and Storey (2016) which states that gender influences improve the performance of MSI perpetrators.

5. CONCLUSION

The following conclusions about the research can be made in light of the findings and discussion:

1. The first hypothesis was tested and the results indicated that there was a 0.0213 percent chance that the COVID-19 epidemic would affect MSI revenue in the West Sumatra Province. Since this probability value is smaller than $\alpha = 0.05$, H_0 is ruled out and H_a is accepted. Consequently, it can be concluded that the COVID-19 epidemic has a major impact on MSI's earnings in the Province of West Sumatra.

2. The likelihood value of capital upon MSI revenue in West Sumatra Province was found to be 0.0152 based on the outcomes of testing the second hypothesis. Since the probability value is smaller than $\alpha = 0.05$, H_0 is ruled out and H_a is accepted. Therefore, it can be concluded that the capital and MSI revenue in the West Sumatra Province have a substantial impact.

3. The loan probability of the MSI revenue in the West Sumatra Province was determined by testing the third hypothesis and the result was 0.4072. Given that this probability value is higher than $\alpha = 0.05$, H_0 is considered acceptable and H_a is refused. Therefore, it can be concluded that loans have no appreciable impact on MSI revenue in the province of West Sumatra.

4. The likelihood value of technology upon MSI revenue in the province of West Sumatra was 0.4956, according to the findings of assessing the fourth hypothesis. Given that this probability value is higher than $\alpha = 0.05$, H_0 is considered acceptable and H_a is refused. Therefore, it can be concluded that technology has no appreciable impact on MSI revenue in the Province of West Sumatra.

5. The fifth hypothesis was tested and the findings indicated that in West Sumatra Province, the probability value of labor on MSI revenue was 0.0000. Since the probability value is smaller than $\alpha = 0.05$, H_0 is ruled out and H_a is accepted. Therefore, it can be concluded that labor has a major impact on MSI revenue in the province of West Sumatra.

6. The likelihood value of working hours on MSI revenue in the province of West Sumatra was 0.0002, according to the findings of testing the sixth hypothesis. Since the probability value is smaller than $\alpha = 0.05$, H_0 is ruled out and H_a is considered acceptable. Therefore, it can be concluded that working hours have a major impact on MSI revenue in the province of West Sumatra.

7. The likelihood value of worker status on MSI revenue for West Sumatra Province was found to be 0.0207 based on the findings of testing the seventh hypothesis. Since the probability value is smaller than $\alpha = 0.05$, H_0 is ruled out and H_a is accepted. Therefore, it can be concluded that worker status has a major impact on MSI revenue in the province of West Sumatra.

8. The outcome of evaluating the eighth hypothesis indicated that in West Sumatra Province, the probability value of schooling on MSI revenue was 0.4862. Given that this value of probability is higher than $\alpha = 0.05$, H_0 is considered acceptable and H_a is refused. Therefore, it can be concluded that schooling has no discernible impact on MSI revenue in the Province of West Sumatra.

9. The likelihood value of training on MSI revenue in the province of West Sumatra was found to be 0.0008 based on the findings of testing the ninth hypothesis. Since the probability value is smaller than $\alpha = 0.05$, H_0 is ruled out and H_a is considered acceptable. Therefore, it can be concluded that training has a major impact on MSI revenue in the province of West Sumatra.

10. The findings of verifying the tenth hypothesis indicated that in West Sumatra Province, the probability significance of age on MSI revenue was 0.0606. Given that this value of probability is higher than $\alpha = 0.05$, H_0 is considered acceptable and H_a is refused. Therefore, it can be concluded that in the West Sumatra Province, age has no discernible impact on MSI revenue.

11. The eleventh hypothesis was tested and the results indicated that in West Sumatra Province, the probability significance of gender on MSI revenue was 0.3344. Given that this value of probability is higher than $\alpha = 0.05$, H_0 is considered acceptable and H_a is refused. Therefore, it can be concluded that gender has no discernible impact on MSI revenue in the Province of West Sumatra.

5.1. Implications

Research conclusions showing the negative impact of the COVID-19 pandemic on the revenue of MSI in West Sumatra imply the need for policies that

1. For MSI actors to continue operating their enterprises, the government must actively provide subsidies and aid to MSI in the West Sumatra Province especially after the COVID-19 pandemic.
2. The government must also enforce all current restrictions. This beneficial rule is particularly necessary in the event of difficult economic conditions, like the COVID-19 pandemic.
3. In addition, the government must give MSI actors convenient resources like coaching, training, workshops and help gaining access to product promotion, among other things. For MSI players to be able to grow in the face of competitive and unpredictable economic conditions, they must have business certainty.

5.2. Research Limitations

Limitations of this research include its geographical focus which is limited to West Sumatra, so generalization of the results to other national or regional contexts needs to be done in the future. Apart from that, limitations in secondary data or measurement of certain variables such as technology or education can also affect the depth of analysis regarding the influence of these factors on the revenue of MSI.

5.3. Suggestions

Based on the limitations of this research, suggestions for further researchers are as follows:

1. Conduct cross-regional studies to expand understanding of the impact of the COVID-19 pandemic on MSI at the country level, for example, Indonesia.
2. Investigating more deeply variables such as technology, education and gender in the context of their influence on micro and small industry revenues.
3. Add research data so that the research analysis is comprehensive.
4. Conduct a comparative analysis with similar sectors in other regions to compare the impact of COVID-19 and other factors that determine it.

Funding: This research is supported by Lembaga Penelitian dan Pengabdian Masyarakat Universitas Negeri (Grant number: 1286/UN35.13/LT/2022).

Institutional Review Board Statement: Not applicable.

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: Provide conceptualization, definitions, empirical analysis, discussions, A.S.; layout, collecting data H.F.; data processing, data curation, A.A.; techniques analysis, and conclusions; A.I.; collecting of literature, project administration, validation, M.A.G. All authors have read and agreed to the published version of the manuscript.

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