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Analysis of Factors Affecting Economies of Scale in Micro and Small Industries (MSI) in Indonesia

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Abstract

This study investigates the factors influencing economies of scale in Indonesian micro and small industries (MSIs), focusing on labor, capital, and technology. Recognizing the critical role of MSIs as the backbone of the Indonesian economy, this research examines how these key production factors impact MSI income, ultimately reflecting their economic scale. A quantitative approach was employed using secondary data from the Central Statistics Agency (CSA) and scientific journals. The sample comprised micro and small industries across all 34 Indonesian provinces, categorized by employee count. Data analysis involved classical assumption tests, multiple linear regression, and hypothesis testing to evaluate the relationship between variables and their influence on MSI income. The findings reveal that the number of workers or labor, capital, and technology positively and significantly affect MSI income partially and simultaneously. An increase in workers directly impacts income due to enhanced productivity. This study recommends improving workforce quality through training, facilitating capital access via innovative financing schemes, and encouraging technology adoption through targeted programs. Future research should explore additional factors influencing the MSI economic scale to inform comprehensive policy development.

Keywords: Capital, labor, micro and small industries, technology.

INTRODUCTION

The micro and small industry (MSME) or micro and small industries (MSI) sector plays a crucial role in the Indonesian economy (Pieter & Utomo, 2023; Ridwan Maksum, Yayuk Sri Rahayu, & Kusumawardhani, 2020). As the backbone of the national economy (Azzahra & Wibawa, 2021), MSIs absorb most of the workforce and contribute significantly to Indonesia's Gross Domestic Product (GDP) (Aliyah, 2022; Kaswinata, Harahap, Nawawi, & Syahputra, 2023; Novitasari, 2022). However, behind its strategic role, MSMEs in Indonesia still face various obstacles in increasing their competitiveness and economic scale (Herawati, 2020).

Economies of scale is a concept where companies can reduce average production costs by increasing their scale (Devintha S.B., Asngari, & Suhel, 2019). MSIs that can achieve economies of scale will be more welfare (Latif, Heriyanto, Mardiana, & Dewi, 2023), efficient (Nadyan, Selvia, & Fauzan, 2021), competitive, and able to increase their income (Hererra, Warokka, & Aqmar, 2023). This study will analyze how the main production factors, namely the number of workers, capital, and technology, affect the income of MSIs in Indonesia, which can then be an indicator of economic scale.

Adequate labor is needed to increase production capacity (Jennings & Shah, 2014; Mappigau & Ferils, 2020). Sufficient capital is needed for investment in equipment, technology, and business expansion (Tambunan, 2021). Adoption of technology can increase efficiency, productivity (Ningsih, 2024), performance and employment, as well as competition (Carroni, Delogu, & Pulina, 2023). Therefore, this study will analyze how these three production factors simultaneously affect the income of MSIs in Indonesia.

This research is expected to benefit various parties, including the government, by formulating more effective policies and programs for developing micro and small industries (MSI). In addition, this research can also help IMK actors make strategic decisions regarding the number of workers, capital, and technology needed to increase economic scale and business income. Academics and researchers are also expected to be able to utilize the results of this study to develop further studies on the economic scale and factors that influence IMK income in Indonesia.

METHOD

This study uses a quantitative approach with a survey method to obtain data on the characteristics of actors through literature review techniques. The data used are secondary data obtained from official sources such as the Central Statistics Agency (BPS) and scientific journals. The study population includes micro and small industry actors in all provinces of Indonesia, with the criteria of micro industries having 1-4 employees and small industries having 5-19 employees. The number of samples was taken from all 34 provinces in Indonesia using the Slovin formula to determine the number of representative samples.

This study covers variables such as labor, gender, wages, technology, capital, and income. Each variable has several indicators that help analyze its impact on economic scale and industrial productivity. Data collection was done by observing online sources and documentation from official data. Data analysis techniques involve classical assumption tests such as normality and

multicollinearity tests and multiple linear regression tests to determine the relationship between variables, followed by hypothesis testing to determine the effect of independent variables on dependent variables.

RESULTS AND DISCUSSION

Table 1: The Results of Multiple Linear Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.645874	0.564129	13.55341	0.0000
X1	0.421548	0.078507	5.369555	0.0000
X2	0.119990	0.059873	2.004080	0.0459
X3	0.227122	0.049852	4.555947	0.0000
R-squared	0.930680	Mean dependent var		6.578703
Adjusted R-squared	0.876690	S.D. dependent var		0.875249
S.E. of regression	0.835535	Akaike info criterion		234.5680
F-statistic	17.23985	Durbin-Watson stat		0.896548
Prob(F-statistic)	0.000000			

Source: : eviews 13

From the Table 1 above, we can make the following equation:

Y = 7.6458+0. 4215+0.1199+0.2271

The constant value obtained is 7.6458. If the variable increases by one average unit, the dependent variable remains at 7.6458. The regression coefficient value for the variable number of workers is 0.4215. If the number of workers increases, then the Y variable in income will increase by 0.4215, and vice versa. The capital coefficient value is 0.1199, which means that if the capital value increases, then Indonesia's income will increase by 0.1199, and vice versa, and if the amount of technology increases by 0.2271, then the income of IMK in Indonesia also increases by 0.2271.

Based on the results of the t-statistic test in the table above, each variable has a probability value of <0.05. For the variable number of workers, the significance is 0.0000. The t-statistic value of 5.3695 indicates that changes in the number of workers or labors positively and significantly affect the income of micro and small industries in Indonesia. Thus, an increase in the workforce directly affects an increase in income.

The findings of this investigation are consistent with the findings of (Aji & Listyaningrum, 2021; Andisa & Utomo, 2022; Tungga Dangin & Marhaeni, 2019). Concerning these findings, Tungga Dangin & Marhaeni (2019) highlighted that boosting labor productivity will encourage

increased production, which will, in turn, lead to a rise in income. This is also in accordance with Midesia (2022) who stated that one of the elements that determine revenue is the amount of labor.

Furthermore, the significance value of 0.0459 (<0.05) for the capital variable also shows that capital has a direct and significant effect on increasing income. The t-statistic value of 2.004 indicates that changes in capital have a positive and significant impact on the income of micro and small industries in Indonesia. This means that increasing capital plays an essential role in increasing income.

Although contrary to the research results of (Andisa & Utomo, 2022), the findings of this investigation are consistent with the findings of (Aji & Listyaningrum, 2021; Dewi & Utari, 2014; Nasra, Zuraidah, & Sartika, 2022; Tungga Dangin & Marhaeni, 2019). Regarding these results, Dijelaskan oleh Rahmah, Kaukab, & Yuwono (2020) explained that high capital will be followed by the ability to produce more business results, thus increasing income. So, it can be briefly interpreted that increasing capital can increase income.

As for the technology variable, the significance of 0.0000 (<0.05) with a t-statistic value of 4.555 confirms that technology positively and significantly affects income. This investigation's findings are consistent with those of (Andisa & Utomo, 2022; Dewi & Utari, 2014; Dyras Suci Prisintya & A.A. Ketut Ayuningsasi, 2023; Nugroho, 2024).

Finally, Based on the F-statistic test, the value of 17.23985 with a probability of 0.00 (<0.05) indicates that labor, capital, and technology simultaneously affect income. In addition, the coefficient of determination value of 0.87 indicates that the three variables explain 87% of the variation in income, while other variables influence the remaining 13%.

The theoretical implications of the findings of this study emphasize that labor, capital, and technology productivity play an integral role in increasing income in micro and small industries (MSI) in Indonesia. Theoretically, these findings support the view that economies of scale can be achieved through increasing productive inputs such as labor and capital, each of which significantly correlates to income output. Confirmation of the capital variable with significance at $p < 0.05$ highlights the crucial role of capital in supporting more productive operations. On the other hand, the significant impact of technology on income suggests that technology adoption can strengthen production capacity and efficiency, which are the basis of economies of scale.

From a practical perspective, the implications of these results provide direction for policymakers to encourage capital increases and technology adoption in the MSI sector to enlarge the economy of scale. Given the significance of capital and technology in increasing income, interventions such as access to finance, technology subsidies, and labor training are essential for developing micro and small industries. With a determination coefficient of 87%, it can be concluded that strategies to increase labor productivity, capital utilization, and technology use have great potential in optimizing the income of this sector.

CONCLUSION

This study analyzes the factors that influence the economy of scale in micro and small industries (MSMEs) in Indonesia, with the results showing that the number of workers, capital, and

technology have a positive and significant influence on increasing MSME income. Increasing the number of workers has a direct impact on increasing income because higher productivity drives increased production. More considerable capital allows MSMEs to produce more business output, contributing to increased income. In addition, increasingly sophisticated technology has also been shown to increase MSME income. Overall, these three variables simultaneously affect MSME income with a contribution of 87%, while the remaining 13% is influenced by other variables not analyzed in this study.

Based on these findings, several recommendations can be made, including improving the quality of the workforce through training and education to increase productivity, providing easy access to capital through innovative financing schemes from the government and financial institutions, and encouraging MSMEs to adopt appropriate technology through technology socialization and training. Further research is also needed to identify other factors that influence the economic scale of MSMEs so that more comprehensive policies can be formulated.

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