JURNAL
EKONOMI KUANTITATIF TERAPAN

Health Policies: Bolstering Human Resources & Healthcare Systems to Reduce Crude Death Rates in 2^6 Countries
Mohamed Sesay, Rudi Purwono, Ni Made Sukartini

Downstream of Leading Primary Sector Industries in Papua Island
Albertus Girik Allo, Manda Sarungallo, Roni Bawole

Assessing Efficiency and Productivity of Micro and Small Industries: An Empirical Study in North Kalimantan
Ariani, Charitin Devi, Settingssulistya Rini Pratiwi, Yohanna Thresia Nainggolan, Wong Sing Yun

Are MSMEs the Key to Poverty Reduction? Dynamic Evidence from Indonesia Utilizing ARDL Analysis
Azhari, Musrizal Musrizal, Win Konadi

Financial Inclusion and Welfare: Comparison between Male-Headed and Female-Headed Households
Lita Jowanti, SettingsBudiono, Anhar Fauzan Priyono

The Role of Amenities and Accessibility on Domestic Tourism Demand in Indonesia
Maya Dethan, Khoirunurrofik

Analysis Of Participation Of Persons With Disabilities In The Labor Market
Ida Ayu Gde Dyastari Saskara, Diah Pradnyadewi

Smoking Cessation In Indonesia: Kick The Habit Today Or Is It Wiser To Hold On Forever?
Miftah Amalia Putri, I Dewa Gede Karma Wisana

Measuring Social Capital in Indonesia: An Item Response Theory (IRT) Approach
Nurul Islamy, Rus'an Nasrudin

JEKT	Volume 18	Nomor 2	Halaman 151-374	Denpasar Agustus 2025	ISSN 2301-8968

pISSN : 2301 – 8968
JEKT ♦ 18 [2] : 231-246 eISSN : 2303 – 0186

Are MSMEs the Key to Poverty Reduction? Dynamic Evidence from Indonesia Utilizing ARDL Analysis

ABSTRACT

This study aims to analyze the impact of MSMEs on poverty alleviation in Indonesia utilizing ARDL approach. The independent variables examined include the quantity of MSMEs, labor, and investment, with poverty serving as the dependent variable. Data spanning from 1990 to 2023 were employed for this analysis. The findings indicate that the number of MSMEs exerts no influence on poverty levels in either the short or long term. Conversely, the MSMEs workforce demonstrates a positive effect on poverty reduction in the short term, while investment yields a more substantial impact in the long term. Given the heterogeneity in poverty levels and MSME development across different regions in Indonesia, it is essential to consider regional variables when assessing the impact of MSMEs. Adopting a more region-specific approach will enable policies to better address the specific needs and challenges encountered by each region, thereby providing a fertile ground for future research.

Keywords: ***MSMEs, invesment, labor, poverty, ARDL***
Classification JEL: L19, E22, J01, I300, C530

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) play a vital role in the economic development of numerous countries, particularly in developing nations. Furthermore, the significance of MSMEs becomes increasingly pronounced during economic crises (Wahyuni, 2020; Ali and Abdallah, 2023; Saad, Mlaker and Elgazzar, 2023; Swatdikun, Pathak and Surbakti, 2024). As essential catalysts for job creation, income distribution, and local economic resilience, MSMEs substantially contribute to poverty reduction and economic growth (Bălu, 2016; Prasetyo, 2020; Siraj and Hágen, 2023). In Indonesia, MSMEs constitute approximately 99% of all enterprises, employ over 97% of the workforce, and contribute more than 60% to the national GDP (Kementrian koperasi dan UKM, 2023). Given their extensive economic footprint, MSMEs are frequently regarded as instrumental in advancing sustainable development and alleviating poverty (Maksimov, Wang and Luo, 2017; Yaregal, 2018; Manzoor *et al.*, 2019). The impact of MSMEs on sustainable development is substantial (Ozturk, Alqassimi and Ullah, 2024). Nevertheless, despite their considerable economic contributions, the degree to

which MSMEs directly influence poverty alleviation remains an unresolved issue that necessitates comprehensive empirical investigation.

The population living in poverty in Indonesia has surpassed 24 million individuals, representing approximately 8.57 percent of the country's total population (Badan Pusat Statistik, 2025). Indonesia continues to grapple with persistent poverty, with many millions of people living below the national poverty line despite sustained economic growth. While macroeconomic policies and social assistance programs have been adopted to address this issue, the role of MSMEs as a potential mechanism for poverty alleviation has not been thoroughly examined. While MSMEs are widely believed to provide employment opportunities and increase household income, empirical evidence on their immediate and long-term impact on poverty remains inconclusive. On the other hand, the problems experienced by MSMEs are limited resources, such as the lack of innovation and entrepreneurship of MSME practitioners (Eikebrokk, Garmann-Johnsen and Olsen, 2021; Sarango-Lalangui *et al.*, 2023; Hasan *et al.*, 2025). Moreover, existing research often ignores the dynamic nature of this relationship, failing to capture short-term fluctuations and long-term equilibrium effects. Addressing these gaps is crucial to designing evidence-based policies utilizing MSMEs as an effective instrument for the alleviation of poverty.

Despite the expanding body of literature on micro, small, and medium enterprises (MSMEs) and their role in economic development, significant gaps persist. Most prior research has predominantly focused on the impact of MSMEs on macroeconomic indicators, such as gross domestic product (GDP) growth and employment, or poverty alleviation, without explicitly linking these outcomes to the expansion of MSMEs. Noteworthy studies, such as those conducted by Ali and Abdallah (2023), Bălu (2016) and, Manzoor et al. (2019), have investigated the effects of

MSMEs on macroeconomic variables. Furthermore, studies employing traditional regression techniques often fail to adequately capture the dynamic interdependence between MSMEs and poverty, resulting in mixed and occasionally contradictory findings. For instance, Zafar et al. (2018), examined the role of MSMEs in poverty reduction in developing countries, specifically Pakistan, utilizing multiple linear regression. Similarly, research conducted by Kowo et al. (2019), explored the impact of MSMEs on poverty in the same country through the application of analysis of variance (ANOVA).

In the context of Indonesia, the impact of Micro, Small, and Medium Enterprises (MSMEs) on poverty has been extensively studied, employing multiple regression and panel analysis methodologies. Notable research contributions include those by Anugerah and Nuraini (2021), Soegoto et al. (2022), Syahputra & Hasibuan (2019), Halim (2020), Widowati & Purwanto (2019), Handayani et al. (2021), Husniyah et al. (2022), Nasrun et al. (2022) dan Lamaile (2022), all of whom have employed panel regression or multiple regression techniques to examine the relationship between MSMEs and poverty. A significant limitation of the existing literature is the static nature of the analytical frameworks utilized. Most empirical studies use panel or cross-sectoral data analysis, but are less able to capture the dynamic relationship between MSMEs and poverty over time. Given that the effects of MSMEs on poverty may not manifest immediately but rather evolve across different time horizons, there is a need for methodological approaches that consider both short-term fluctuations and long-term equilibrium effects. Auto-Regressive Distributed Lag (ARDL) models offer a robust econometric framework to address this gap, enabling researchers to analyze both the direct impacts and long-run relationships between the expansion of MSMEs and the reduction of poverty. By applying the ARDL model to Indonesian time series data, this study aims to bridge this gap, providing a

comprehensive empirical analysis that accounts for both short-run adjustments and long-run equilibrium relationships.

The objective of this study is to empirically assess the relationship between MSMEs and poverty alleviation in Indonesia utilizing the Auto-Regressive Distributed Lag (ARDL) model. One of the advantages of the ARDL approach is its resilience to deviations when the research sample is small and its lack of requirement for unit root testing (Emeka and Kelvin, 2016). The ARDL methodology permits a thorough analysis of both short-run and long-run effects, offering a more nuanced understanding of the role that MSMEs play in influencing poverty dynamics. Specifically, this research seeks to ascertain whether the scaling up of MSMEs results in a significant reduction in poverty levels over time or whether other structural constraints hinder their efficacy in promoting economic inclusion. The findings of this study are anticipated to yield valuable insights for policymakers, thereby informing the development of strategies that enhance the poverty alleviation potential of MSMEs.

RESEARCH METHODS

This study employs a quantitative methodology utilizing a time-series data analysis design to investigate the dynamic relationship between the number of Micro, Small, and Medium Enterprises (MSMEs), labor, and investment, and their effects on the poverty rate in Indonesia. The primary objective of this research is to discern both the direct and indirect effects of these variables on poverty alleviation while considering both short-term and long-term dynamics. The analytical framework adopted in this study is the Auto-Regressive Distributed Lag (ARDL) model, which facilitates a comprehensive examination of the causal relationships among the variables under investigation. ARDL offers greater flexibility and ease of use than VAR and VECM, especially in the analysis of non-stationary data and when the cointegration relationship is unclear. These advantages of ARDL make it a popular model in various

economic and financial research. The data utilized in this research is secondary and encompasses an annual timeframe from 1990 to 2023. Information regarding the poverty rate, the number of MSMEs, labor, and investment has been sourced from official Indonesian government agencies, including the Central Bureau of Statistics (BPS) and the Ministry of Cooperatives and Small and Medium Enterprises (Kemenkop UKM).

Table 1. Operational of variable

Variable	Measurement	Symbol	Source
Poverty	the population of individuals classified as living in poverty, defined as those whose income falls below the national poverty line	*Pov*	Central Bureau of Statistics (BPS)
SMEs	The number of micro, small, and medium enterprises registered in Indonesia, which serves as an important indicator of the capacity of the MSME sector in the economy.	*Smes*	The Ministry of Cooperatives and Small and Medium Enterprises (Kemenkop UKM)
Labor	The size of the labor force in the informal sector, which is a key component in the operation of MSMEs	*Emp*	The Ministry of Cooperatives and Small and Medium Enterprises (Kemenkop UKM)
Invesment	The volume of investments directed towards the MSME sector and associated industries, which contribute to enhancing business capacity and competitiveness	*Inv*	The Ministry of Cooperatives and Small and Medium Enterprises Kemenkop UKM)

The research procedure commences with the collection of relevant and valid data from reliable sources. Following data collection, the subsequent step involves checking and pre-processing the data, which includes conducting stationarity testing employing the ADF (Augmented Dickey-Fuller) test to ascertain that the data does not contain unit roots and is suitable for use in the ARDL model (Dickey *et al.*, 2012). Upon verifying that the data exhibits stationary characteristics, the ARDL model can be applied. The next phase entails the identification of the ARDL model, which facilitates the analysis of both the short-term and long-term relationships between the dependent variable (poverty) and the independent variables

(number of MSMEs, labor, and investment). Additionally, the ARDL model accommodates potential asymmetries in the relationships between the variables and provides insights into the lag effects that may arise among these variables (Pesaran, Shin and Smith, 2001).

Once the model has been identified, the ARDL model is estimated utilizing statistical software such as EViews 12 to yield accurate and valid results. The estimation process will encompass short-run and long-run coefficient tests, along with cointegration tests, to ensure that a significant long-run relationship exists between the variables under analysis. The outcomes of this analysis will offer a comprehensive understanding of the extent to which each factor (number of MSMEs, labor, and investment) influences the poverty rate in Indonesia, both in the short and long term.

The econometric equation for the model to be used is:

$$Pov_t = \beta_0 + \beta_1 Smes_t + \beta_2 emp_t + \beta_3 inv_t + \varepsilon_t \quad (1)$$

Where Pov = poverty, *Smes* = amount of smes, *emp* = amount of smes labor, *inv* = invesment, $\beta 0$ = Intercept or Constant, $\beta 1, \beta 2, \beta 3$ = Regression Coefficient, εt = Error Term. The ARDL model equation is utilized to ascertain the poverty of a MSMEs, illustrating a linear relationship among poverty, total of MSMEs , labor and, invesment.

$$\Delta Povt = \alpha_0 + \sum_{i=1}^{n} \alpha 1 i \Delta Smes\, t1 + \sum_{i=1}^{n} \alpha 2 i empt1 + \sum_{i=1}^{n} \alpha 3 i \Delta invt1 + \beta_1 smes_{t=1} + \beta_2 emp_{t=1} + \beta_3 inv_{t=1} \quad (2)$$

where Δ denotes the lag. The coefficients (β_1-β_3) signify the long-run relationship, whereas the coefficients (α_1-α_3) represent the short-run dynamics of the model. The error correction model derived from:

$$\Delta Povt = \alpha_0 + \sum_{i=1}^{n} \alpha 1 i \Delta Smest1 + \sum_{i=1}^{n} \alpha 2 i \Delta empt1 + \sum_{i=1}^{n} \alpha 3 i \Delta invt1 + \Upsilon ECT_{t=1} + \varepsilon_t \quad (3)$$

where Υ represents the parameter associated with speed adjustment, and ECT denotes the residual derived from the cointegration model as calculated in equation (2).

The results of this ARDL analysis are anticipated to yield comprehensive insights into the direct and indirect effects of the number of Micro, Small, and Medium Enterprises (MSMEs), labor, and investment on poverty levels in Indonesia. Furthermore, the analysis aims to offer policy recommendations that may be implemented to enhance poverty reduction efforts through the development of the MSME sector.

RESULT AND DISCUSSION

Descriptive Statistics

The descriptive statistics presented in this study are intended to enrich the analysis and support the main results. The average growth of MSMEs in Indonesia for the period 1990-2023 reached 52.7 million units, absorbed an average workforce of 96.7 million people and invested IDR584.2 billion with an average poor population of more than 33 million people. Table 2 also explains that the highest number of poor people in Indonesia occurred in 1998, totaling more than 49 million people. This was due to the global economic crisis which had an impact on increasing the poverty rate in Indonesia. The peak incidence of poverty in Indonesia occurred in 1998, with over 49 million individuals classified as poor, whereas the lowest incidence was recorded in 2019, with more than 25 million individuals. In terms of small and medium-sized enterprises (SMEs), the highest number was observed in 2023, totaling 66.2 million units, compared to the lowest figure of 36.7 million units in 2000. The highest employment in the micro, small, and medium-sized enterprise (MSME) sector was reported in 2015, with 123.2 million individuals engaged, while the lowest employment was in 1998, with 64.3 million individuals. Lastly, the highest investment generated by MSMEs was achieved in 2019, amounting to over IDR 1,716.7 trillion, in contrast to the lowest investment recorded in 1999, which exceeded IDR 106.1 trillion.

Table 2. Statistic Descriptif Variabel

	SMEs (unit)	Employement (person)	Invesment (IDR-million)	Poverty (person)
Mean	52.751.226	96.755.264	584.220	33.023.038
Std. Dev	10.082.682	20.026.689	634.849	6.716.452
Max.	66.200.897	123.229.386	1.716.750	49.510.987
Min.	36.784.036	64.313.573	106.143	25.114.541

Source: Data processed, 2025

Result of Econometric Analysis

Unit root test

The initial step in the Autoregressive Distributed Lag (ARDL) model involves conducting a stationarity test. The results of the stationarity tests for each variable, as presented in Table 3, indicate that all variables exhibit stationarity at the first difference. This finding suggests that all variables are devoid of unit roots.

Table 3. Result of Stationer Test

Variabel	Level		First Difference		Remark
	t-statistic	Prob	t-statistic	Prob	
SMEs	-0.5256	0.8701	-6.3140	0.000	I(1)
Inv	-0.1269	0.9359	-4.5196	0.001	I(1)
Emp	-1.5027	0.5158	-5.3997	0.000	I(1)
Pov	-0.8848	0.7761	-7.0605	0.000	I(1)

Source: Data processed by eviews 12

After conducting the stationary test, the subsequent step involves performing the cointegration test utilizing the Johansen method. The Autoregressive Distributed Lag (ARDL) model is deemed appropriate if each variable exhibits cointegration, provided that the variables are stationary and initially not cointegrated. The results of the cointegration test are presented in Table 4.

Tabel 4. Result of Johansen Test Cointegration

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE (s)	Eigenvalue	Trace Statistic	0,05 crtitical value	Prob.**
None	0.708243	67.05609	47.85613	0.0003
At Most 1	0.526146	37.49209	29.79707	0.0054
At Most 2	0.493772	19.56754	15.49471	0.0115
At Most 3	0.125888	3.229111	3.841465	0.0723

Trace test indicates no cointegration at the 0.05 level

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE (s)	Eigenvalue	Trace Statistic	0,05 crtitical value	Prob.**
None	0.708243	29.56401	27.58434	0.0275
At Most 1	0.526146	17.92455	21.13162	0.1327
At Most 2	0.319854	16.33843	14.26460	0.0232
At Most 3	0.125888	3.229111	3.841465	0.0723

Max-Eigenvalue tets indicates no cointegration at the 0.05 level

Source: Data processed by eviews 12

Table 4 indicates that cointegration is present, as the probability value exceeds 0.05. Consequently, the Autoregressive Distributed Lag (ARDL) estimation is deemed suitable for this study. Following the completion of stationary and cointegration tests, the subsequent step involves assessing cointegration through the bounds test. This procedure aims to ascertain the existence of long-run cointegration. Specifically, if the value of the F-statistic surpasses the upper bound, it confirms the occurrence of cointegration.

Tabel 5. Result of Bound Test

			Bound Crticial Value	
Test Stat.	Values	Significant Level	I (0)	I (1)
F-Statistic	11.9555	10%	2,37	3,2
		5%	2,79	3,67
		2,5%	3,15	4,08
		1%	3,69	4,66

Source: Data processed by eviews 12

The results presented in Table 5 demonstrate that the value of the F-statistic exceeds the upper bounds at the 10%, 5%, 2.5%, and 1% significance levels. This finding suggests that, in the long term, there is a cointegrating relationship among the number of micro, small, and medium enterprises (MSMEs), labor, investment, and poverty in Indonesia. The estimated short-term and long-term relationships are detailed in Tables 6 and 7.

Tabel 6. Short-term Estimation

Variable	**Cooficient**	**t-stat**	**P Value**
Constant	-0.8001	-0.4388	0.6633
D (Pov(-1))	0.0183	-0.1051	0.9175
D (Pov(-2))	-0.3539	-2.9483	0.0090***
D (SMEs)	0.1764	0.3742	0.7129
D (Emp)	-0.6753	-2.0718	0.0538*
D (Inv)	-0.0816	-2.1750	0.0440**
R2	0.5653		
R2 Adjust	0.4375		
F-Stat	4.4224		0.0091***

Note: ***indicate significant at 1%, **significant at 5%, *significant at 10%

Table 7. Long-term Estimation

Variable	Coefficient	t-stat	P Value
SMEs	0.1321	0.3625	0.7214
Emp	-0.5056	-1.9674	0.0617*
Inv	-0.0611	-1.9999	0.0657*
C	-0.5999	-0.4365	0.6679*

Note: **indicate significant at 5%, *significant at 10%

Based on Tables 6 and 7, it can be concluded that there is cointegration both in the short run and the long run, respectively. However, the variable representing small and medium enterprises (SMEs) does not have a statistically significant effect on poverty in either the short run or the long run, as indicated by a probability value exceeding 0.05. In contrast, labor and investment are observed to exert an influence on poverty levels in Indonesia. This can be seen from the resulting P value of 0.009 which is smaller than 0.05.

The primary finding of the Autoregressive Distributed Lag (ARDL) analysis indicates that an increase in the number of Micro, Small, and Medium Enterprises (MSMEs) has not significantly contributed to poverty reduction, either in the short or long term. However, an increase in the number of MSMEs may enhance individuals' access to employment opportunities, particularly within the informal sector, which, in turn, aids in alleviating poverty (Azhari, 2020; Bu'ulolo, Purba and Sihotang, 2021). This finding aligns with the theory of inclusive economics, which posits that the informal sector, predominantly comprised of MSMEs, plays a crucial role in providing employment for marginalized or impoverished segments of society. This study contradicts several prior investigations that assert a relationship between the number of MSMEs and poverty levels (Kowo, Adenuga and Sabitu, 2019; Widowati and Purwanto, 2019; Handayani, Prasetyanto and Hutajulu, 2021; Lamaile, 2022; Nasrun, Nujum and Sufri, 2022).

In the long-term analysis, the results reveal that the accumulation of investment in the MSME sector exerts a more pronounced effect on poverty reduction than do factors such as the number of MSMEs and the workforce size. This suggests that investment, whether in the form of capital, technology, or infrastructure, plays a more significant role in enhancing the capacity of MSMEs to generate sustainable employment and directly contribute to poverty alleviation. This finding supports the perspective that investment in the MSME sector can enhance the productivity and competitiveness of micro, small, and medium enterprises, thereby reducing economic inequality and poverty (Yaregal, 2018; Zafar, Waqas and Butt, 2018; Kowo, Adenuga and Sabitu, 2019; Manzoor *et al.*, 2019).

Moreover, the results indicate an asymmetrical relationship between these variables, with the long-term effects being more substantial than the short-term effects, particularly concerning investment. This discrepancy may be attributed to the complex process of capacity building within the MSME sector, wherein investment not only facilitates job creation but also contributes to productivity enhancements that require time to yield tangible economic outcomes. While labor in the MSME sector can exert a more immediate impact on poverty reduction, investment has been demonstrated to be a more critical factor in ensuring the sustainability of poverty alleviation efforts over the long term. A critical element in enhancing the capacity of the MSME workforce is training and skill development. A skilled and innovative workforce will elevate the competitiveness of MSMEs (Gladysz *et al.*, 2023; Okolo *et al.*, 2023; Ozturk, Alqassimi and Ullah, 2024).

Overall, the findings suggest that a multifaceted approach—which encompasses increasing the number of MSMEs, providing labor, and scaling up investment—can serve as an effective strategy for poverty reduction in Indonesia. This underscores the

necessity for integrated and sustainable policies that focus not only on job creation but also on improving the quality and capacity of MSMEs through adequate investment. The findings contribute to a deeper understanding of the role of MSMEs in poverty alleviation by emphasizing that support for MSMEs should be implemented over an extended timeframe to maximize impact.

CONCLUSION

This study aims to analyze the role of Micro, Small, and Medium Enterprises (MSMEs) in alleviating poverty in Indonesia through the application of the Dynamic Autoregressive Distributed Lag (ARDL) approach. The results indicate that the number of MSMEs, labor, and investment collectively influence the poverty rate in Indonesia by 43.7%, with varying effects in the short term and long term. A significant finding of this study is that labor within the MSME sector exerts a positive impact on poverty reduction in the short run, whereas investment demonstrates a more substantial influence in the long run. Furthermore, this study underscores the necessity of a comprehensive approach to the development of the MSME sector, wherein investments aimed at enhancing the capacity of MSMEs can expedite positive outcomes for poverty reduction. In this context, the research findings offer valuable insights for policymakers in designing programs that not only increase the number of MSMEs but also enhance their capacity through improved infrastructure, access to capital, and skills training. Nevertheless, limitations regarding data coverage and the identification of causality highlight the need for further research to deepen the understanding of this dynamic relationship.

REFERENCE

Ali and Abdallah (2023) 'The Role of Small and Medium Enterprises in Achieving Economic Goals of the Vision of Saudi Arabia 2030 *', *Journal of Asian Finance, Economics and Business*, 10(2), pp. 301–311. Available at: https://doi.org/10.13106/jafeb.2023.vol10.no2.0301.

Anugerah, F.N. and Nuraini, I. (2021) 'Peran Umkm Dalam Menanggulangi Kemiskinan Di

Provinsi Jawa Timur', *Jurnal Ilmu Ekonomi JIE*, 5(1), pp. 27–41. Available at: https://doi.org/10.22219/jie.v5i1.13772.

Azhari, A. (2020) 'Faktor-Faktor yang mempengaruhi Penyerapan Tenaga Kerja pada Sektor UMKM di Indonesia: Pendekatan Error Correction Model', *Jurnal Samudra Ekonomi dan Bisnis*, 12(1), pp. 76–88. Available at: https://doi.org/10.33059/jseb.v12i1.2435.

Badan Pusat Statistik (2025) *Persentase penduduk miskin Indonesia*.

Bălu, P.E. (2016) 'The role of small and medium enterprises in economy', *Quality - Access to Success*, 17(4), pp. 394–397. Available at: https://doi.org/10.47703/ejebs.v68i4.454.

Bu'ulolo, Purba and Sihotang (2021) 'Analisis Pengaruh Jumlah Unit Usaha, Nilai Ekspor, Dan Pertumbuhan Ekonomi Terhadap Penyerapan Tenaga Kerja Sektor Umkm Di Indonesia', *Journal of Economics and Business*, 2(1), pp. 71–80. Available at: https://doi.org/10.36655/jeb.v2i1.516.

Dickey, D.A. *et al.* (2012) 'Distribution of the Estimators for Autoregressive Time Series With a Unit Root', *Journal of the American Statistical Association*, (July 2015), pp. 37–41. Available at: https://doi.org/10.1080/01621459.1979.10482531.

Eikebrokk, T.R., Garmann-Johnsen, N.F. and Olsen, D.H. (2021) 'Co-creation in networks of SMEs: A conceptual model of the cocreation process', *Procedia Computer Science*, 181(2019), pp. 360–366. Available at: https://doi.org/10.1016/j.procs.2021.01.179.

Emeka and Kelvin, A. (2016) 'Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation', *Journal of Statistical and Econometric Methods*, 5(3), pp. 63–91.

Gladysz, B. *et al.* (2023) 'Platform-based support for AI uptake by SMEs: guidelines to design service bundles', *Central European Management Journal*, 31(4), pp. 463–478. Available at: https://doi.org/10.1108/CEMJ-08-2022-0096.

Halim, A. (2020) 'Pengaruh pertumbuhan usaha mikro, kecil dan menengah terhadap pertumbuhan ekonomi kabupaten mamuju', *Jurnal Ilmiah Ekonomi Pembangunan*, 1(2), pp. 157–158.

Handayani, I.T., Prasetyanto, P.K. and Hutajulu, D.M. (2021) 'Analisis Pengaruh Jumlah Umkm, Jumlah Penyerapan Tenaga Kerja Umkm Dan Harapan Lama Sekolah Terhadap Jumlah Kemiskinan Di Provinsi Jawa Tengah Tahun 2008-2017', *DINAMIC: Directory Journal of Economic*, 3(4), pp. 820–833.

Hasan, M. *et al.* (2025) 'Sustainable agricultural knowledge-based entrepreneurship literacy in agricultural SMEs: Triple bottom line investigation', *Journal of Open Innovation: Technology, Market, and Complexity*, 11(1), p. 100466. Available at: https://doi.org/10.1016/j.joitmc.2025.100466.

Husniyah, A., Basyah, N.A. and Mustofa, A. (2022) 'Dampak Usaha Mikro Kecil dan Menengah (UMKM) Terhadap Pengentasan Kemiskinan dan Pengangguran di Kota Sibolga', *Jurnal Economica Didactica*, 3(1), pp. 46–59. Available at:

https://jurnal.usk.ac.id/JED/article/view/24850.

Kementrian koperasi dan UKM (2023) *Statistik usaha mikro, kecil dan menengah tahun 2010-2019*.

Kowo, S.A., Adenuga, O.A.O. and Sabitu, O.O. (2019) 'The role of SMEs development on poverty alleviation in Nigeria', *Insights into Regional Development*, 1(3), pp. 214–226. Available at: https://doi.org/10.9770/ird.2019.1.3(3).

Lamaile, E.F. (2022) 'Pengaruh Pertumbuhan Umkm, Indeks Keterbukaan Perdagangan, Pertumbuhan Pendapatan Per Kapita, Dan Indeks Pembangunan Manusia Terhadap Pengentasan Kemiskinan Di 5 Negara Asean', *J-Rema*, 1(3), p. 38. Available at: https://doi.org/10.25170/jrema.v1i3.4593.

Maksimov, V., Wang, S.L. and Luo, Y. (2017) 'Reducing poverty in the least developed countries: The role of small and medium enterprises', *Journal of World Business*, 52(2), pp. 244–257. Available at: https://doi.org/10.1016/j.jwb.2016.12.007.

Manzoor, F. *et al.* (2019) 'Role of SME in poverty alleviation in SAARC Region via Panel data analysis', *Sustainability (Switzerland)*, 11(22), pp. 1–14. Available at: https://doi.org/10.3390/su11226480.

Nasrun, A.P., Nujum, S. and Sufri, M. (2022) 'Pengaruh Usaha Mikro, Kecil dan Menengah (UMKM) Dalam Mengatasi Kemiskinan Dan Pengangguran di Kota Makassar', *Tata Kelola Jurnal Magister Manajemen Universitas Muslim Indonesia*, 9(1), pp. 78–87. Available at: http://pasca-umi.ac.id/index.php/tata.

Okolo, V.O. *et al.* (2023) 'Does financing SMEs guarantee inclusive growth and environmental sustainability in the European union?', *Heliyon*, 9(4), p. e15095. Available at: https://doi.org/10.1016/j.heliyon.2023.e15095.

Ozturk, I., Alqassimi, O. and Ullah, S. (2024) 'Digitalization and SMEs development in the context of sustainable development: A China perspective', *Heliyon*, 10(6), p. e27936. Available at: https://doi.org/10.1016/j.heliyon.2024.e27936.

Pesaran, M.H., Shin, Y. and Smith, R.J. (2001) 'Bounds testing approaches to the analysis of level relationships', *Journal of Applied Econometrics*, 16(3), pp. 289–326. Available at: https://doi.org/10.1002/jae.616.

Prasetyo, P.E. (2020) 'The Role of Government Expenditure and Investment for MSME Growth: Empirical Study in Indonesia', *Journal of Asian Finance, Economics and Business*, 7(10), pp. 471–480. Available at: https://doi.org/10.13106/jafeb.2020.vol7.no10.471.

Saad, N.A., Mlaker, K.S. and Elgazzar, S. (2023) 'Assessing the Situation of Micro, Small, and Medium-Sized Enterprises in the Emerging Markets of Egypt Under COVID-19 Implications', *Studies in Business and Economics*, 18(2), pp. 270–289. Available at: https://doi.org/10.2478/sbe-2023-0037.

Sarango-Lalangui, P. *et al.* (2023) 'Impact of environmental sustainability on open innovation in SMEs: An empirical study considering the moderating effect of gender',

Heliyon, 9(9), p. e20096. Available at: https://doi.org/10.1016/j.heliyon.2023.e20096.

Siraj, N. and Hágen, I. (2023) 'Performance management system and its role for employee performance: Evidence from Ethiopian SMEs', *Heliyon*, 9(11). Available at: https://doi.org/10.1016/j.heliyon.2023.e21819.

Soegoto, H., Soegoto, S.W. and Meyer, D.F. (2022) 'the Role of Domestic Investment, Foreign Investment, and Micro, Small and Medium-Sized Enterprises for Poverty Reduction in Indonesia', *Journal of Eastern European and Central Asian Research*, 9(5), pp. 901–913. Available at: https://doi.org/10.15549/jeecar.v9i5.1072.

Swatdikun, T., Pathak, S. and Surbakti, L.P. (2024) 'Sustainable Small and Medium Enterprises (SMEs) in the times of COVID-19', *Progress in Disaster Science*, 22(April), p. 100327. Available at: https://doi.org/10.1016/j.pdisas.2024.100327.

Syahputra and Hasibuan (2019) 'Pengaruh usaha mikro kecil menengah, penyerapan tenaga kerja dan tingkat pendidikan terhadap pengentasan kemiskian di kabupaten simalungun', *Jurnal Akuntansi dan Pembelajaran*, 8(3), pp. 130–144.

Wahyuni, S. (2020) 'PERAN STRATEGIS UMKM DALAM MENOPANG PEREKONOMIAN INDONESIA DI TENGAH PANDEMI COVID 19', *J-ESA (Jurnal Ekonomi Syariah)*, 3(2), pp. 280–302.

Widowati, M. and Purwanto, A.B. (2019) 'Pengaruh Umkm Terhadap Tingkat Kemiskinan Dengan Pendapatan Domestik Bruto Sebagai Intervening', *Fokus Ekonomi : Jurnal Ilmiah Ekonomi*, 14(2), pp. 376–390. Available at: https://doi.org/10.34152/fe.14.2.376-390.

Yaregal, T.G. (2018) 'The Role of Micro and Small Enterprises for Poverty Alleviation', *International Journal of Research Studies in Agricultural Sciences (IJRSAS)*, 4(12), pp. 38–47. Available at: https://doi.org/10.20431/2454-6224.0412002.

Zafar, M., Waqas, M. and Butt, M.N. (2018) 'the Role of Small and Medium Enterprises on Poverty Reduction in Developing Country: a Case of Pakistan', *Pakistan Business Review*, 20(3), pp. 703–713.