



Original Article

Poverty in Indonesia: An Application of Error Correction Model (ECM) Approach

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Abstract: Poverty is one of the biggest concerns of the Indonesian government currently towards achieving social welfare. Indonesia's poverty tends to experience a downward trend but has not yet reached its target. This study analyses the long-term and short-term effects of unemployment, household per capita expenditure and ICT on poverty. This study uses panel data with the ECM approach in 34 provinces in Indonesia from 2015 to 2021. The result indicated that unemployment does not affect poverty in the long and short term. Meanwhile, per capita, household spending, and ICT negatively affect poverty in Indonesia. The government's efforts to overcome unemployment have been reasonable because unemployment does not affect poverty. The government can control household per capita expenditure through socialization or household education to prioritise basic needs first to achieve prosperity. Increasing the reach of ICT development in Eastern Indonesia and areas where ICT facilities are inadequate increases ICT access, use and expertise in reducing poverty.

Keywords: poverty; unemployment; household per capita expenditures; ICT; error correction model.



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1. Introduction

One of the world's programs set by the United Nations (UN) through the Sustainable Development Goal's (SDGs) is to end all forms of poverty worldwide (United Nations Development Programme, 2016). Indonesia is one of the member countries of the United Nations, which is solving the problem of poverty towards achieving social welfare. Santika et al. (2021) said that poverty is one of the serious problems experienced by every country in the world. According to Asian Development Bank data, Indonesia is ranked 4th (fourth) after Timor Leste, Laos and the Philippines, with the proportion of the population living below the poverty line of US\$1.9 per day in neighbouring Southeast Asian countries, namely 22 percent, 10 percent, respectively. percent, 4.7 percent and Indonesia 2.7 percent of the total population. This shows that Indonesia's poverty rate is still relatively high compared to neighbouring countries in Southeast Asia.

The World Bank (2004) determines the causes of poverty in the world community, including the inability to meet basic needs due to lack of income and assets (Lack of income and assets). Meanwhile, Annur (2013) states that unequal income distribution, high unemployment rates, less job opportunities, low education levels, low wage rates, low use of

technology, quality of natural resources can determine the factors that cause poverty in Indonesia is still low, culture/culture (tradition), work ethic, low worker motivation, and unstable politics.

Based on Central Bureau of Statistics data in Table 1, the change in the percentage of poor people and several factors that influence it can be seen. From 2015 to 2019 the percentage of poor people in Indonesia tends to experience a slow and fluctuating decline. In 2020 the poverty percentage has increased by 9.78 percent or around 27.55 million people; in 2019 it was 9.41 percent or around 25.14 million people, thus experiencing an increase of 0.37 percent or an increase in the poor number population of about 2.41 million people. It was caused by the COVID-19 pandemic, which caused the population to lose jobs and income, reducing the population's per capita spending on consumption. Then, it will increase again in 2021 by 0.36 percent. The figure below also shows that unemployment rate and household per capita expenditures have tended to fluctuate over the last 7 years from 2015 to 2021 regarding the percentage of poverty. Meanwhile, ICT experiences a slow increase every year.

With various Indonesian government policies to alleviate poverty, one is reducing unemployment (Suripto & Subayil, 2020). According to Giovanni (2018), unemployment is closely related to the poverty level. Unemployment is also a serious macro problem affecting Indonesia's poverty level (Suripto & Subayil, 2020). Residents who do not have a job will not have income, so it will affect the level of consumption or spending per capita. Tuankotta (2012) states that a household's income level can determine the fulfilment of its food and non-food needs. Alisjahbana & Yusuf (2003) said that generally, the allocation for food spending would be lower if the level of public consumption expenditure is also lower. In this modern, all-digital era, the poverty rate can be reduced through the role of the community in accessing information and communication to improve their quality of life (Ruhjana & Essa, 2020). Juairiyah & Hendrixon (2017) stated that one of the reasons people become poor is a lack of access to information. Various kinds of information are easily and quickly obtained through the internet network.

Table 1. Comparison of the Growth of Unemployment Rate, Household Per Capita Expenditures, ICT and Poverty Percentage in Indonesia, 2015-2021

Year	UR (%)	(%) *1	HPE (IDR/Person/Year)	(%) *2	ICT (%)	(%) *3	Poverty (%)	(%) *4
2015	5,81	-	10,150	-	3.88	-	11,22	-
2016	5.50	-5.34	10,420	2.66	4,34	11.86	10.86	-3.21
2017	5,33	-3.09	10,664	2.34	4.96	14,29	10.64	-2.03
2018	5,10	-4.32	11059	3.70	5.07	2,22	9,82	-7.71
2019	4.98	-2.35	11,299	2,17	5,32	4.93	9,41	-4.18
2020	4.94	-0.80	11013	-2.53	5.59	5.08	9.78	3.93
2021	6,26	26,72	11.156	1.30	5,76	3.04	10,14	3.68

Source: Central Bureau of Statistics (2021, 2022b, 2022c, 2022d).

Note: *1 Growth of Unemployment Rate (%), *2 Growth of Household Per Capita Expenditures (%), *3 Growth of ICT, (%), *4 Growth of Poverty Percentage (%)

Table 1 shows several development comparisons between the unemployment rate, household per capita expenditures, ICT and the percentage of poverty. Over the last seven years, the development of the percentage of poverty tends to experience negative and fluctuating developments. Despite experiencing significant negative growth in 2018, poverty increased in 2020 and 2021. One of the major causes driving the increase in poverty in 2020 and 2021 Indonesia is the COVID-19 pandemic. With various government policies in disaster management, several domestic companies reduced their workforce, causing unemployment. The development of unemployment rate experienced negative and fluctuating growth from 2015-2020 but increased significantly in 2021, leading to an increase in poverty. Hasballah (2021) examined the effect of the open unemployment rate on poverty in Aceh Province in 23 Regencies/Cities using associative quantitative. Papadakis et al. (2020) discuss how unemployment affects poverty in Greek Youth (not in education, employment, or training). Nansadiqa et al. (2019) analysed the effect of unemployment on poverty reduction in Indonesia for the 1990-2017 period. Putra & Arka (2016) examined open unemployment against poverty rates in Bali. Konečný (2016) examines the relationship between technological unemployment and poverty in two companies in the Czech Republic, proving that technological unemployment is a threat and a tool to escape poverty. Cholili (2014) and Pranata (2013) also examined the effect of unemployment on poverty in Indonesia. Ukpere & Slabbert (2009) analysed the relationship between unemployment and poverty in third-world countries.

Furthermore, household per capita expenditures tend to experience slow development every year and fluctuate. They even experienced significant negative developments in 2020. It was due to the emergence of unemployment due to the COVID-19 pandemic, which made them reduce consumption spending because they no longer had income. On the basis of study by Anser et al. (2020) examined the effect of per capita income and the unemployment rate on poverty incidents using the Generalized Method of Moments (GMM) estimator panel in 16 diversified countries during the 1990-

2014 period. Then, Meimela (2019) examined the effect of per capita spending on poverty in Indonesia in 2015-2017. Sangadah et al. (2020) also analysed the effect of average per capita expenditure on poverty using a descriptive quantitative method in Kebumen Regency in 2009-2018. Hoang et al. (2014) also examined the expenditure of non-agricultural rural households on poverty in Vietnam, using the Viet Nam Household Living Standards Survey in 2002, 2004, 2006, and 2008. Furthermore, Sarti et al. (2017) examined household per capita expenditures for health to poverty, using Family Expenditure Survey data from the Italian Statistical Institute (ISTAT) in Italy for the period 1997 to 2013.

In Table 1, ICT also tends to experience a significant and slow decline. However, in 2020 the use of ICT has increased due to the COVID-19 pandemic. Mora-Rivera & García-Mora (2021) examined the effect of internet access (technology and communication) on poverty in Mexico. Njangang et al. (2022) analysed the cross-country effects of ICT on wealth inequality. in a sample of 45 developed and developing countries over the 2000-2017 period. Mushtaq & Bruneau (2019) conducted a case study by assessing the role of Information and Communication Technology (ICT) in poverty reduction, using a collection of panel data from 62 (sixty-two) countries between 2001-2012. Asongu et al. (2021) examined the relationship between ICT dynamics in 57 developing countries from 2012–2016. Ahmed & Al-Roubaie (2013) examines the role of ICT in reducing poverty in Arab countries in achieving sustainable development. Bandyopadhyay (2014) also examined the association of ICT with poverty in world countries in 1992-1997 by the World Bank. The potential of information and communication technology as an effective tool for reducing poverty has been demonstrated in several developing countries such as Peru, China, Solomon Islands, Zimbabwe and India (United Nations Development Programme, 2016). Based on previous problems and research, I was motivated to provide the latest empirical evidence by analysing the effect of unemployment, household per capita expenditures, and ICT on poverty in Indonesia in the short and long term due to a downward trend but still not reaching the target on poverty rates and other variables other variables described above.

2. Literature Review

The process of poverty alleviation is dynamic and temporary, many of the poor are trapped in poverty for a long period of time, most can get out of it. Based on World Bank data; 1.1 billion people are very poor. The highest number is Asia, but Africa has the largest proportion, almost half of the population (Ukpere & Slabbert, 2009). Nearly half of the world's 6 billion people are poor; 8 million people die every year because they are too poor to survive, while 1 billion people are in danger due to lack of food, while others live in a world of abundance (Ukpere & Slabbert, 2009). Ahmed & Al-Roubaie (2013) state that poverty is man-made, originating from greed, exploitation, injustice, inadequate knowledge, gender discrimination, unequal opportunities, corruption, social division, income/expenditure inequality, level high unemployment, lack of public services, adverse political, social, environmental and other effects. Todaro & Smith (2015) stated that poverty is the root of all development problems.

One of the causes of poverty is the emergence of unemployment. According to Wardiansyah et al. (2017), unemployment can occur due to an imbalance in the labour market offered that exceeds the amount of labour demanded. Ukpere & Slabbert (2009) considers that unemployment includes all people who can work but do not have a job. If there is unemployment, resources are wasted. Not only will productivity decrease, people's income will also decrease, which can lead to poverty and other social problems. In a developing country like Indonesia, every economy has problems that stem from unemployment. In their empirical research, Turner (1995) and Zinyemba (2014) stated that unemployment's well-known effects on the economy could affect economic factors such as per capita income, quality of health care, the standard of living and poverty. According to Papadakis et al. (2020), when unemployment increases, there are several access limitations, such as access to health care, a higher risk of dropping out of school for young people and a higher risk of poverty. Furthermore, Hoover & Wallace (2007) found that poverty is very sensitive to economic conditions, where an increase in unemployment causes an increase in poverty.

Halim (2012) interprets per capita expenditure based on the notion of household consumption expenditure, namely the expenditure of all household members in one household. According to Gilarso (2004), a household has a different and unequal amount of expenditure due to developments from time to time. Bista (2010) stated if a household succeeds in meeting all the consumption needs of its family members, either by income, bartering or selling assets, then its social function is unfettered, and its participation in society is meaningful so that it can get out of poverty. If not, then they are classified as poor households. Poverty that comes from inadequate spending/consumption is called unfulfilled desires (Bista, 2010). Hoang et al. (2014) also revealed that increasing household spending can reduce poverty. Research by Sarti et al. (2017) shows that poor households have lower expenditures. When household finances are in difficult circumstances, purchasing power will be lost. It causes household expenses for daily needs to be delayed and gradually unable to meet the needs of family members, which will eventually become poor households.

ICT can measure digital gaps or digital gaps between regions, ICT development growth, and measure ICT development potential. Mushtaq & Bruneau (2019) showed the important role of ICT in improving socioeconomic poverty reduction. ICT, through the use of modern mobile phones and computers can help reach the poor in several ways, through increasing the availability of financial products, rural development, providing fast market information to

farmers, eliminating middlemen, and contributing to the education and contributing to the health sector. Ahmed & Al-Roubaie (2013) also argue that ICT will enable greater access to knowledge, skills and ideas that drive innovation and create job opportunities. Effective ICT strategies for poverty alleviation can be promoted through government services through e-government, e-business and e-learning. Based on the theories that are relevant to the research results, the hypotheses in this study are as follows:

H₁ : Unemployment positively affects poverty in the short and long term in Indonesia.

H₂ : Expenditures per Capita and ICT have a negative effect on Poverty in the short and long term in Indonesia.

3. Materials and Methods

This study uses panel data to analyze short-term and long-term relationships using the Error Correction Model (ECM) model estimation technique. ECM is an estimation approach in correcting the regression equation on each variable individually, not stationary in the short term, so that it returns to its equilibrium value in the long term. This is if there is cointegration in the constituent variables (Ajija et al., 2011). ECM can capture short-term conditions (Pertwi & Sudarsono, 2021). Using data on the number of poor people, the open unemployment rate, expenditure per capita, and ICT in 34 provinces in Indonesia during the 2015-2021 period from the Central Statistics Agency. The form of the long-term dynamic panel data regression model in this study was adopted from the model built by Olayungbo (2021), which was then developed to become:

$$\ln PP_{it} = \beta_0 + \beta_1 UR_{it} + \beta_2 \ln HPE_{it} + \beta_3 ICT_{it} + \varepsilon_{it}, \tag{1}$$

Where, lnPP (Poor People) is the log-natural number of poor people (percent), Unemployment Rate (UR) is the Open Unemployment Rate (percent), lnHPE (Household Percapita Expenditure) is the log-natural expenditure per capita household (percent), ICT (Information and Communications Technology) is IP-TIK or ICT (percent). Meanwhile, β_0 is a constant, $\beta_1; \beta_2; \beta_3$ is the long run coefficient, and ε is the error term. Furthermore, the form of the dynamic panel data regression model in the short term was adopted from the model built by Olayungbo (2021), which was then developed to become:

$$\Delta \ln PP_{it} = \beta_0 + \sum_{i=1}^{\eta} \alpha_i \Delta \ln PP_{it-i} + \sum_{i=1}^{\rho} \chi_i \Delta UR_{it-i} + \sum_{i=1}^{\phi} \omega_i \Delta \ln HPE_{it-i} + \sum_{i=1}^{\psi} \pi_i \Delta ICT_{it-i} + \theta ECT_{it-i} + \mu_{it}, \tag{2}$$

Where ECT is Error Correction Term, θ is the speed of adjustment from short-term dynamics to long-term equilibrium, $\alpha_i; \chi_i; \omega_i$ and π_i are short run coefficients, and μ are error terms. The ECT coefficient is θ ; is expected to have a negative and significant sign on the long-term balance between poverty and the independent variables (Olayungbo, 2021). There are several steps of analysis in this study, which include: first, the stationarity test. If the stationarity test is not carried out, it will produce a spurious regression equation (Gujarati & Porter, 2006). Second, selecting the best panel model, the CEM, FEM, and REM model approaches can be used. Third, the classical assumption test can use normality, heteroscedasticity, multicollinearity, and autocorrelation tests. Fourth, the cointegration test can use the approach of the unit root test on the ECT regression equation. Furthermore, fifth, panel data estimation uses the ECM approach, analyzing estimates in the long term and short term.

4. Results

4.1. Descriptive Statistics

The results of the descriptive analysis for PP, UR, HPE and ICT variable data for the period 2015 to 2021 are presented in Table 2 below.

Table 2. Result of Descriptive Statistics

	PP (person)	UR (%)	HPE (Rupiah/Person/Year)	ICT (%)
Means	787,288.7	5.23	10,437,870	5.07
Median	363,545	4.67	10,282,500	5.08
Maximum	4,775,970	19.51	18,527,000	9.25
Minimum	40,930	0.88	6,469,000	2.41
Std. Dev.	1,111,174	2.79	2,164,777	0.98
Obs.	238	238	238	238

Table 2 displays that parts of Central Indonesia (East Java Province) have high poverty rates and parts of Eastern Indonesia (Papua Province and Maluku Province) have high open unemployment rates, low per capita household

expenditure and high ICT is low. Then, parts of Central Indonesia (North Kalimantan Province) have low poverty rates, parts of Central Indonesia (Bali Province) have low open unemployment rates, and parts of Western Indonesia (DKI Jakarta Province) have high per capita household expenditures.

4.2. Stationary Testing

In this study, we use the Augmented Dickey-Fuller (ADF) method for measuring the stationary data.

Table 3. Result of Stationarity Testing using ADF Method

Variables	Levels P-values	Diff. 1 P-values	Conclusion
PP	0.1535	0.0000	Stationary D1
UR	0.0001	0.0000	Stationary Level
HPE	0.0179	0.0000	Stationary D1
ICT	0.6495	0.0000	Stationary D1

Table 3 captures the result of the stationery test using the ADF method, with a significance level of 5 percent. It is necessary to make a differentiation to obtain stationary data. After differentiation, we obtain stationary data on the first differentiation for all variables; exception UR was stationary at level.

4.3. Panel Data Regression

In panel data regression, parameter coefficient estimation can be done through 3 approaches: CEM, FEM, and REM (see Table 4). Chow, Hausman, and Lagrange Multiplier tests can be carried out to determine the best estimation model.

Table 4. Result of Model Selection of Panel Data Regression

Model	Probability			Conclusion
	Chow test	Hausman test	Langrange Multiplier Test	
Model Regression	1.079040 (0.3654)	0.000000 (1.0000)	3.958709** (0.0000)	REM

Note: ** 5 percent significance.

Chow test results show that the p-value is 0.3654, so the p-value is $< \alpha = 5$ percent or $0.3654 > 0.05$. That is, at a significance level of 5 percent, it is obtained that CEM is better than FEM. Furthermore, the Hausman test has a p-value of 1.0000, so the p-value $< \alpha = 5$ percent or $1.0000 > 0.05$. That is, at a significance level of 5 percent, the REM decision is better than FEM. Finally, the Lagrange Multiplier test has a p-value of 0.0000, so the p-value $< \alpha = 5$ percent or $0.0000 < 0.05$. At a significance level of 5 percent, REM decisions are better than CEM. Based on these results it can be concluded that in the Long-Term model, the estimation will be carried out using REM.

4.4. Result of Diagnostics Testing

Classical assumption testing on panel data regression is needed to ensure that the estimated parameter coefficients will be Best Linear Unbiased Estimators (BLUE).

Table 5. Result of Classical Assumption

Test	Regression Models	Conclusion
Normality (Jarque Bera)	2.088410 (0.351972)	Normally distributed
Heteroscedasticity (Breusch-Pagan-Godfrey)	0.9118	No heteroscedasticity
Multicollinearity (VIF)	VIF<10	No multicollinearity
Autocorrelation (Durbin-Watson)	1.8142 (dU) < 2.052191 (DW) < 2.1858 (4-dU)	No autocorrelation

Table 5 shows the Jarque Bera test carried out the normality assumption test. The Jarque Bera statistic was 2.088410 with a p-value of 0.351972 > from a significance level of 5 percent, so the model is normally distributed. Furthermore, the heteroscedastic assumption test using the Breusch Pagan LM Test shows a probability value of 0.9118, greater than the 5 percent significance level. That is, there is no heteroscedasticity in the regression model. Then the multicollinearity test shows no multicollinearity problems where the VIF value < 10. For autocorrelation, the Durbin-Watson (DW) statistical value is 1.4600 and the DW statistical table with dL = 1.8142 and dU = 2.1858. The statistical value of DW is greater than dU and smaller than 4-dU, so it can be concluded that there is no autocorrelation.

4.5. Cointegration Testing

Using the cointegration test of the ADF unit root test method on ECT.

Table 6. ADF Cointegration Test Results

	t-Statistics	Probability
Augmented Dickey-Fuller test statistics	-3.547063	0.0076
Significance		
1% level	-3.457865	
5% levels	-2.873543	
10% levels	-2.573242	

Table 6 displays the unit root test results indicating that the probability value is smaller than the significance level of 5 percent. It means that there is cointegration between the variables studied, namely poverty (PP), open unemployment rate (UR), per capita household expenditure (HPE), and ICT (ICT).

4.6. Panel Test using Error Correction Model

The results of the ECM estimation will obtain short-term and long-term relationships between PP, UR, HPE, and ICT at the first level of differentiation and the REM panel model. In this model, poverty/lnPP is the dependent/bound variable, while the independent/free variables are UR, HPE, and ICT. The ECM estimation results can be seen in the following Table.

Table 7. Long-Term Estimation Results

Variable	Coefficient	std. Error	t-statistic	Prob.
C	0.009067	0.005404	1.677874	0.0949
D(UR)	-0.000853	0.000760	-1.122339	0.2631
D(lnHPE)	-1.389027**	0.325162	-4.271807	0.0000
D(ICT)	-0.004265**	0.002107	-2.023969	0.0443

Note: **5% significance.

Table 7 captures that with a significance level of 5 percent, two independent variables affect poverty in Indonesia in the long term, lnHPE and ICT. The open unemployment rate or UR has a coefficient value of -0.000853 and a probability value of 0.2631, greater than a 5 percent significance, meaning that the UR variable does not affect poverty in the long run. In the long run, the unemployment rate accepts H_0 and rejects H_1 . These results align with research Suropto & Subayil (2020) that unemployment does not affect poverty. Suropto & Subayil (2020) stated that unemployment does not affect poverty because educated unemployed dominate the unemployed. They can still meet their needs even when they are unemployed. It is because the unemployment group is open. Some of them have their own business, are in the informal sector and some are also who have jobs of less than 35 hours per week. According to Cholili (2014) and Pranata (2013) stated that those who live in urban areas choose to look for jobs that are more on their level of education, so some of them do not work voluntarily. It is because they have other sources of financial problems.

Household per capita expenditures or lnHPE has a coefficient value of -1.389027 and a probability value of 0.0000, which is less than a 5 percent significance, meaning that in the long run lnHPE has a significant negative effect on poverty. Thus, if there is an increase in lnHPE by 1 percent, it will reduce poverty by -1.39 percent. In the long run, household expenditure per capita accepts H_2 and rejects H_0 . This result is in line with the research by Sangadah et al. (2020); Anser et al. (2020) and Yu & Li (2021), that household per capita expenditure has a negative and significant effect on poverty. Bista (2010) said if a household succeeds in meeting all the consumption needs of its family members, either by income, bartering or selling assets. Then, its social function is not constrained, and its participation in society is meant to get out of poverty. If not, then they are classified as poor households. Sarti et al. (2017) stated that

households decide whether to spend or not depending on whether they are in good economic condition or not. In the long run, purchasing power will be lost when household finances are difficult. So that in the long run, it causes household expenses for daily needs to be delayed and gradually unable to meet the needs of family members, eventually becoming poor households.

ICT has a coefficient value of -0.004265 and a probability value of 0.0443, which is less than a 5 percent significance. In the long run, ICT significantly negatively affects poverty in Indonesia. Thus, if there is an increase in ICT by 1 percent, it will reduce poverty by -0.0043 percent. In the long run, ICT accepts H_2 and rejects H_0 . This result is in line with research Ahmed & Al-Roubaie (2013); Setyaningsih (2017); Nisa & Budiarti (2020); Mushtaq & Bruneau (2019); Mora-Rivera & García-Mora (2021); Asongu et al. (2021); Christiani & Nainupu (2021) and Yin et al. (2021) which found that ICT had a statistically significant negative effect on poverty. In 2007, it was reported that there were 20 million internet users in Indonesia. Then in 2014, it increased rapidly to 83.7 million people, the sixth most globally. In 2019, before the COVID-19 pandemic occurred, the number of internet users in Indonesia was estimated at 175 million people and internet users have now touched 210 million people or around 77% of Indonesia's population. Globally, Indonesia's ICT development has increased from year to year. In 2015, Indonesia's ICT was ranked 114th out of 175 countries, while in 2016 Indonesia was ranked 111th out of 176 countries (Central Bureau of Statistics, 2021).

Based on Central Bureau of Statistics data (2021), Indonesia has the only province with a high ICT in 2021, namely DKI Jakarta Province. Meanwhile, the provinces of East Nusa Tenggara and Papua occupy the low ICT category during the 2020–2021 period. Then, the provinces that occupied the moderate ICT category for two consecutive years, namely, in addition to those that occupied the high and low categories previously mentioned.

Table 8. Result of Short-Term ECM Estimation

Variable	Coefficient	std. Error	t-statistics	Prob.
C	0.007170	0.001776	4,036,728	0.0001
D(lnPP(-1))	-0.440508**	0.108177	-4,072,093	0.0001
D(UR)	0.001256	0.000854	146,993	0.1435
D(lnHPE)	-1.131459**	0.081094	-1,395,241	0.0000
D(ICT)	-0.007606**	0.001958	-3,883,959	0.0001
ECT(-1)	-0.304299**	0.084916	-3,583,523	0.0004

Note: ** is significant at 5 percent.

Table 8 displays that with a significance level of 5 percent, 3 (three) variables significantly affect poverty in the short term. Poverty in the previous year or ln PP in lag 1 (one) significantly negatively affects current poverty. It can be seen from the probability value of 0.0001, which is smaller than 0.05 ($\alpha = 5\%$). With a coefficient value of -0.440508, this means that if there was an increase in poverty in the previous year by 1 percent, it would reduce poverty in the current year by -0.44 percent. It is due to poverty between regions towards convergence in balance and the community trying to get out of the poverty trap, or it can be caused by external conditions that cause poverty within the community. According to Psacharopoulos & Nguyen (1997) and Holtman & Yap (1978), poverty's causes are very complex and can be caused by economic, social, cultural, social institutions and environmental conditions. Social institutions, such as financial resource facilities, health care, housing, transportation, recreation, and so on, can increase people's prosperity so that they can be lifted out of poverty (Holtman & Yap, 1978). The environmental conditions, such as geographical conditions. According to the different conditions in Indonesia, the government carries out an equitable distribution of development. So that people with low incomes can enjoy public services but do not rule out the possibility of a natural disaster which can cause people to lose their property or be used up to meet their daily needs again in the face of natural disasters.

Murdiyana & Mulyana (2017) stated that, in Indonesia, the government has carried out various strategies in poverty alleviation, such as social protection, increasing access to basic community services, empowering poor community groups, and inclusive development. There are direct government programs (direct cash assistance (BLT), rice for people experiencing poverty, BPNT) or indirectly (Jamkesmas, IDT program, BOS), but poverty still exists, meaning that almost all areas, both urban and rural poverty can easily be found (Murdiyana & Mulyana, 2017). The unemployment rate or UR in lag 1 does not affect poverty because the probability value is 0.1435, greater than 0.05 ($\alpha = 5\%$). In the short term, the unemployment rate rejects H_1 and accepts H_0 . In the short term, if a country is not in a state of decline or steady economic growth, unemployment is not a serious problem, because employment can absorb the workforce. Then, for households that do not have income limits due to unemployment, unemployment cannot directly affect poverty. So that when those who are unemployed do not earn wages, they may still be able to meet their basic needs by using savings or having other financial sources. Cholili (2014) and Pranata (2013) stated that those who live in urban areas

have other sources of financial problems so they choose to look for jobs that are more in accordance with their level of education.

Household per capita expenditures or lnHPE in the 1st lag significantly negatively affect poverty because the probability value of 0.0000 is smaller than 0.05 ($\alpha = 5\%$). With a coefficient value of -1.865593, meaning that if there is an increase in per capita household expenditure in the previous year was 1 percent, it will reduce poverty in the current year by -1.87 percent. In the short term, household per capita spending accepts H_2 and rejects H_0 . Sarti et al. (2017) mentioned that whether households spend or not depends on when they are in good economic condition. In the short term, when household finances are limited, households will reduce non-food consumption and only consume food or primary needs. If they cannot meet the needs of family members, it will become a poor household in the end. Yusof & Duasa (2010) stated that the better standard of living or household welfare if the proportion of non-food consumption expenditure is higher. It is because non-food consumption does not have a maximum limit, while food consumption has a maximum limit. In line with Kahar (2010) said that urban communities tend to consume more non-food needs, such as the health and education sectors, while rural communities still prioritize food consumption compared to non-food.

Then, ICT in the 1st lag has a significant negative effect on poverty because the probability value is 0.0001 which is smaller than 0.05 ($\alpha = 5\%$). With a coefficient value of -0.007606, meaning that if there is an increase in ICT in the previous year by 1 percent, it will reduce poverty in the current year by -0.0076 percent. In the short term, ICT accepts H_2 and rejects H_0 . This result is in line with research Ahmed & Al-Roubaie (2013); Setyaningsih (2017); Nisa & Budiarti (2020); Mushtaq & Bruneau (2019); Mora-Rivera & García-Mora (2021); Asongu et al. (2021); Christiani & Nainupu (2021) and Yin et al. (2021) which found that ICT has a significant negative effect statistic on poverty. ICT using sophisticated mobile phones and computers can help reach people experiencing poverty in Indonesia in several ways, through increasing the availability of financial products (e-banking, mobile-banking, mobile ATM), rural development, and providing fast market information to farmers. Increases their bargaining power, eliminates intermediaries, contributes to the education sector (increasing Internet access will facilitate virtual education through electronic and print media), and contributes to the health sector (helping the rapid dissemination of medical information and enabling online operating facilities). Ahmed & Al-Roubaie (2013) stated that a knowledge-based economy that relies on ICT can strengthen the ability of poor countries to reduce poverty and sustain development.

ICT's benefits can speed up the development process helping millions of poor people escape poverty. ICTs also enable public services delivered to users across a wide continent to any destination, regardless of distance, at an affordable cost. ICTs make government services more transparent and more efficient. Effective ICT strategies for poverty alleviation can be promoted through government services through e-government, e-business and e-learning. In Table 8, the ECT coefficient is significantly negative. In estimating ECM, it must be noted that the error correction term (ECT) must be negative. This negative sign illustrates that the estimated model is valid (Hamzah & Handri, 2017). In the short term, all the coefficients in the ECM estimation above can relate to the dynamic model leading to equilibrium. It shows how the imbalance due to shock in the previous year is adjusted to the long-term balance this year (Hamzah & Handri, 2017).

5. Conclusions

This study concludes that the open unemployment rate does not affect poverty in the long term. At the same time, household per capita expenditures and ICT have a significant negative effect on poverty in Indonesia. Then, in the short term, the open unemployment rate also does not affect poverty, whereas poverty in the previous period, household per capita expenditures, and ICT significantly negatively affect poverty in Indonesia. Also, the unemployment rate does not affect poverty in the long and short term, so the government's efforts to overcome this problem have been good, because unemployment is only at the natural unemployment rate. Then, the government can control household per capita expenditures through socialization or household education to prioritise basic needs first to achieve prosperity. Thus, household per capita expenditures can be channelled to purchase staple food and other goods to support daily living needs. For ICT, it is recommended that the government can increase the outreach of ICT development both in Eastern Indonesia and areas that are not yet adequate with ICT facilities so as to increase ICT access, use and expertise in reducing poverty.

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References

- Ahmed, A., & Al-Roubaie, A. (2013). Poverty reduction in the Arab world: the use of ICTs. *World Journal of Science, Technology and Sustainable Development*, 10(3), 195–211. <https://doi.org/10.1108/WJSTSD-02-2013-0014>
- Ajija, S. R., Sari, D. W., Setianto, R. H., & Primanti, M. R. (2011). Cara cerdas menguasai Eviews. In *Jakarta: Salemba Empat* (1st ed.). PT. Salemba Empat.
- Alisjahbana, A., & Yusuf, A. A. (2003). Poverty dynamics in Indonesia: panel data evidence. In *Department of Economics, Padjadjaran University*.
- Annur, R. A. (2013). Faktor-faktor yang mempengaruhi kemiskinan di kecamatan jekulo dan mejobo kabupaten kudu tahun 2013. *Economics Development Analysis Journal*, 2(4), 409–426.
- Anser, M. K., Yousaf, Z., Nassani, A. A., Alotaibi, S. M., Kabbani, A., & Zaman, K. (2020). Dynamic linkages between poverty, inequality, crime, and social expenditures in a panel of 16 countries: two-step GMM estimates. *Journal of Economic Structures*, 9(1), 43. <https://doi.org/10.1186/s40008-020-00220-6>
- Asongu, S., Amari, M., Jarboui, A., & Mouakhar, K. (2021). ICT dynamics for gender inclusive intermediary education: Minimum poverty and inequality thresholds in developing countries. *Telecommunications Policy*, 45(5), 102125. <https://doi.org/10.1016/j.telpol.2021.102125>
- Bandyopadhyay, S. (2014). Are Mass Media and ICTs Associated with Inequality and Poverty? In *Economic Well-Being and Inequality: Papers from the Fifth ECINEQ Meeting* (Vol. 22, pp. 185–216). Emerald Group Publishing Limited. <https://doi.org/10.1108/S1049-258520140000022005>
- Bista, A. (2010). *A Study of Association Among Rural Household Expenditure Inequality, Asset Inequality, and Poverty*.
- Central Bureau of Statistics. (2021). *Technology, Information and Communication Development Index*.
- Cholili, F. (2014). Analisis Pengaruh Pengangguran, Produk Domestik Regional Bruto (PDRB) Dan Indeks Pembangunan Manusia (IPM) Terhadap Jumlah Penduduk Miskin (Studi Kasus 33 Provinsi Di Indonesia). 5(5), 557–577.
- Christiani, N. V., & Nainupu, A. E. (2021). Pengaruh Akses Terhadap Internet, Listrik dan PDRB Per Kapita Terhadap Tingkat Kemiskinan di Nusa Tenggara Timur Tahun 2015-2019. *Jurnal Statistika Terapan (ISSN 2807-6214)*, 1(1), 37–52.
- Gilarso, T. (2004). *Pengantar ilmu ekonomi makro*. Kanisius.
- Gujarati, D., & Porter, D. C. (2006). Fundamentals of econometrics. In *Jakarta: Penerbit Erlangga*.
- Halim, M. A. (2012). *Teori Ekonomi Edisi I*. Jelajah Nusa.
- Hamzah, R. A., & Handri, H. (2017). Analisis Interest Rate Pass-Through Pada Mekanisme Transmisi Kebijakan Moneter Indonesia. *EKONOMIS : Journal of Economics and Business*, 1(1), 125–135. <https://doi.org/10.33087/ekonomis.v1i1.13>
- Hasballah, I. (2021). Pengaruh Tingkat Pengangguran Terbuka Terhadap Kemiskinan Provinsi Aceh di Kabupaten/Kota. *Jurnal Al-Fikrah*, 10(1), 38–48.
- Hoang, T. X., Pham, C. S., & Ulubaşoğlu, M. A. (2014). Non-Farm Activity, Household Expenditure, and Poverty Reduction in Rural Vietnam: 2002–2008. *World Development*, 64(1), 554–568. <https://doi.org/10.1016/j.worlddev.2014.06.027>
- Holtman, A. G., & Yap, L. (1978). Does punishment pay. *Public Finance*, 33(1–2), 90–97.
- Hoover, G. A., & Wallace, G. (2007). Examining the Relationship Between the Poverty Rate and Economic Conditions in the Southern United States. *Journal of Income Distribution*, 16(1), 132–143. <https://doi.org/10.25071/1874-6322.2745>
- Juairiyah, O., & Hendrixon, H. (2017). Penerapan E-Office Dalam Administrasi Perkantoran. *Jurnal Pembangunan Nagari*, 2(1), 75–84.
- Kahar, M. (2010). *Analisis Pola Konsumsi Daerah Perkotaan Dan Pedesaan Serta Keterkaitannya Dengan Karakteristik Sosial Ekonomi Di Propinsi Banten*.
- Konečný, Z. (2016). Corporate Life Cycle as a Tool to Solve Technological Unemployment Just as to Lift Out of Poverty. *Procedia - Social and Behavioral Sciences*, 220, 191–199. <https://doi.org/10.1016/j.sbspro.2016.05.484>
- Meimela, A. (2019). Model pengaruh tingkat setengah pengangguran, pekerja informal dan pengeluaran perkapita disesuaikan terhadap kemiskinan di Indonesia tahun 2015-2017. *Jurnal Ilmu Ekonomi Dan Pembangunan*, 19(1), 7–13.

- Mora-Rivera, J., & García-Mora, F. (2021). Internet access and poverty reduction: Evidence from rural and urban Mexico. *Telecommunications Policy*, 45(2), 102076. <https://doi.org/10.1016/j.telpol.2020.102076>
- Murdiyana, M., & Mulyana, M. (2017). Analisis Kebijakan Pengentasan Kemiskinan Di Indonesia. *Jurnal Politik Pemerintahan Dharma Praja*, 10(1), 73–96. <https://doi.org/10.33701/jppdp.v10i1.384>
- Mushtaq, R., & Bruneau, C. (2019). Microfinance, financial inclusion and ICT: Implications for poverty and inequality. *Technology in Society*, 59, 101–154. <https://doi.org/10.1016/j.techsoc.2019.101154>
- Nansadiqa, L., Masbar, R., & Majid, M. S. A. (2019). Does economic growth matter for poverty reduction in Indonesia. *East African Scholars Journal of Economics, Business and Management*, 2(2), 2–7.
- Nisa, K., & Budiarti, W. (2020). Pengaruh teknologi informasi dan komunikasi terhadap tingkat kemiskinan di Indonesia tahun 2012-2017. *Seminar Nasional Official Statistics, 2019(1)*, 759–768. <https://doi.org/10.34123/semnasoffstat.v2019i1.186>
- Njangang, H., Beleck, A., Tadadjeu, S., & Kamguia, B. (2022). Do ICTs drive wealth inequality? Evidence from a dynamic panel analysis. *Telecommunications Policy*, 46(2), 102246. <https://doi.org/10.1016/j.telpol.2021.102246>
- Olayungbo, D. O. (2021). Global oil price and food prices in food importing and oil exporting developing countries: A panel ARDL analysis. *Heliyon*, 7(3), e06357. <https://doi.org/10.1016/j.heliyon.2021.e06357>
- Papadakis, N., Amanaki, E., Drakaki, M., & Saridaki, S. (2020). Employment/ unemployment, education and poverty in the Greek Youth, within the EU context. *International Journal of Educational Research*, 99, 101503. <https://doi.org/10.1016/j.ijer.2019.101503>
- Pertiwi, B. P., & Sudarsono, H. (2021). Analisis Likuiditas Bank Umum Syariah dengan Pendekatan Autoregressive distributed lag (ARDL). *Al-Tijary*, 6(2), 113–128. <https://doi.org/10.21093/at.v6i2.3163>
- Pranata, Y. O. R. (2013). Pengaruh Pertumbuhan Ekonomi, Upah Minimum, Tingkat Pengangguran Terbuka, Dan Inflasi Terhadap Kemiskinan Di Indonesia Tahun 2009-2011. *Semarang: UNS*.
- Psacharopoulos, G., & Nguyen, X. N. (1997). *The role of government and the private sector in fighting poverty* (Vol. 346). World Bank Publications.
- Putra, I., & Arka, S. (2016). Analisis Pengaruh Tingkat Pengangguran Terbuka, Kesempatan Kerja, Dan Tingkat Pendidikan Terhadap Tingkat Kemiskinan Pada Kabupaten/Kota Di Provinsi Bali. *EP Unud*, 7(3), 416–444.
- Ruhyana, N. F., & Essa, W. Y. (2020). Opportunities of Using Information and Communication Technology in Reducing Poverty. *JEJAK*, 13(2), 319–331. <https://doi.org/10.15294/jejak.v13i2.25036>
- Sangadah, S. K., Laut, L. T., & Jalunggono, G. (2020). Pengaruh faktor-faktor penyebab kemiskinan di Kabupaten Kebumen tahun 2009-2018. *DINAMIC: Directory Journal of Economic*, 2(1), 229–243.
- Santika, T., Wilson, K. A., Law, E. A., St John, F. A. V, Carlson, K. M., Gibbs, H., Morgans, C. L., Ancrenaz, M., Meijaard, E., & Struebig, M. J. (2021). Impact of palm oil sustainability certification on village well-being and poverty in Indonesia. *Nature Sustainability*, 4(2), 109–119. <https://doi.org/10.1038/s41893-020-00630-1>
- Sarti, S., Terraneo, M., & Tognetti Bordogna, M. (2017). Poverty and private health expenditures in Italian households during the recent crisis. *Health Policy*, 121(3), 307–314. <https://doi.org/10.1016/j.healthpol.2016.12.008>
- Setyaningsih, R. (2017). Peran Teknologi Informasi dan Komunikasi dalam Mengentaskan Kemiskinan Perkotaan (Studi Kasus pada Komunitas Punk di Kota Yogyakarta). *Perspektif Komunikasi: Jurnal Ilmu Komunikasi Politik Dan Komunikasi Bisnis*, 1(1).
- Suripto, S., & Subayil, L. (2020). Pengaruh Tingkat Pendidikan, Pengangguran, Pertumbuhan Ekonomi Dan Indeks Pembangunan Manusia Terhadap Kemiskinan Di D.I.Yogyakarta Priode 2010-2017. *GROWTH Jurnal Ilmiah Ekonomi Pembangunan*, 1(2), 127–143.
- Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). Pearson Education. New York.
- Tuankotta, K. (2012). Hubungan Pengeluaran Rumah Tangga untuk Makanan dengan Kecukupan Total Asupan Energi pada Anak Usia 24-59 Bulan di Provinsi Jawa Barat Tahun 2010 (Analisis Data Sekunder Riskesdas 2010). In *Skripsi. Universitas Indonesia. Depok*.
- Turner, J. B. (1995). Economic Context and the Health Effects of Unemployment. *Journal of Health and Social Behavior*, 36(3), 213. <https://doi.org/10.2307/2137339>
- Ukpere, W. I., & Slabbert, A. D. (2009). A relationship between current globalisation, unemployment, inequality and poverty. *International Journal of Social Economics*, 36(1/2), 37–46. <https://doi.org/10.1108/03068290910921172>
- United Nations Development Programme. (2016). *Mercury Management for Sustainable Development*. United Nations Development Programme.

Wardiansyah, M., Yulmardi, Y., & Bahri, Z. (2017). Analisis faktor-faktor yang mempengaruhi tingkat pengangguran (Studi kasus provinsi-provinsi se-Sumatera). *E-Jurnal Ekonomi Sumberdaya Dan Lingkungan*, 5(1), 13–18. <https://doi.org/10.22437/jeles.v5i1.3924>

World Bank. (2004). *Definition of Poverty*. <http://www.worldbank.org>

Yin, X., Meng, Z., Yi, X., Wang, Y., & Hua, X. (2021). Are “Internet+” tactics the key to poverty alleviation in China’s rural ethnic minority areas? Empirical evidence from Sichuan Province. *Financial Innovation*, 7(1), 30. <https://doi.org/10.1186/s40854-021-00236-2>

Yu, L., & Li, X. (2021). The effects of social security expenditure on reducing income inequality and rural poverty in China. *Journal of Integrative Agriculture*, 20(4), 1060–1067. [https://doi.org/10.1016/S2095-3119\(20\)63404-9](https://doi.org/10.1016/S2095-3119(20)63404-9)

Yusof, S. A., & Duasa, J. (2010). Consumption patterns and income elasticities in Malaysia. *Malaysian Journal of Economic Studies*, 47(2), 91–106.

Zinyemba, O. (2014). *The Alleviation of Rural Unemployment and Poverty Through Chicken Farming: A Case Study*. University of Johannesburg (South Africa).