



Analysis of “Extreme Poverty” for the special Region of Yogyakarta in Indonesia

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Poverty is a problem experienced in almost every country, including Indonesia. The Sustainable Development Goals (SDGs) document states that by 2030 governments around the world agree to eliminate extreme poverty. The Government of Indonesia has issued Instruksi Presiden (Inpres) Number 4 of 2022 concerning the Acceleration of the Elimination of Extreme Poverty in the context of eliminating extreme poverty throughout Indonesia by 2024. This research was conducted in special region of Yogyakarta in Indonesia using data from the 2022 National Economic Survey (Susenas) using logistic regression. Independent variables are KRT gender, average years of schooling, unemployment rate, PKH subsidy recipients, BPJS PBI participation, disability, uninhabitable houses, chronic diseases, under-five ownership and access to microfinance. The results showed that the gender of the head of household, average length of schooling, unemployment rate, PKH subsidy recipients, BPJS PBI participation, disability, uninhabitable

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houses, chronic diseases, under-five ownership and access to microfinance significantly affected poor households. But for extreme poor households, only the chronic disease variable did not have a significant effect. Extreme poor households in urban and rural areas also have different characteristics.

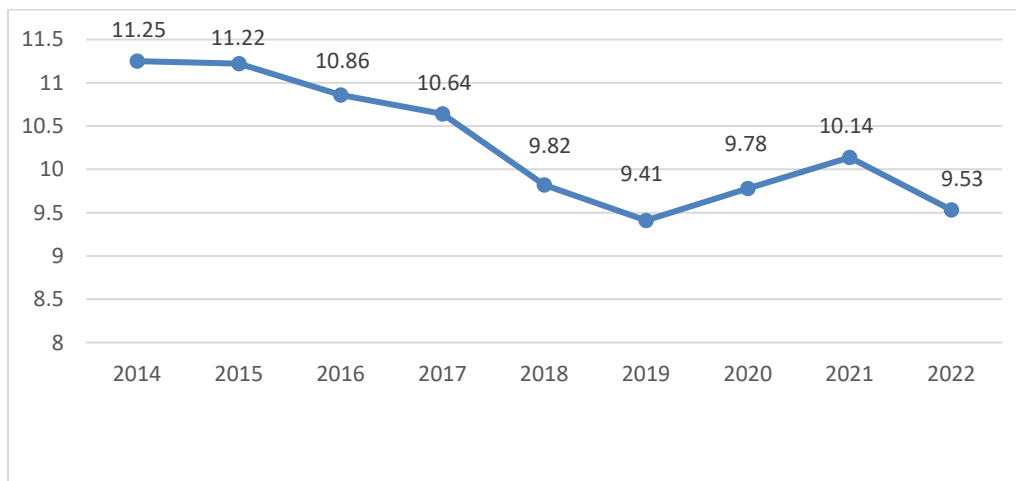
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1. INTRODUCTION

One of the problems faced by Indonesian people both in urban and rural areas is poverty. The definition of poverty is also very diverse because poverty includes complex and multidimensional problems which means it is very related between dimensions of human needs. The inability to meet the minimum decent standard of living can be said to be poverty (Todaro, 2006). Poverty is the inability to meet a minimum standard of living. Meanwhile, according to the Central Statistics Agency, poverty can be interpreted as a person's inability to meet basic needs (basic need approach), so poverty is seen as the inability from the economic side to meet the basic needs of food and not food measured according to the mission line. The World Bank uses poverty lines based on income levels in adjusted international dollars (referred to as Purchasing Power Parity or PPP) to compare the incomes of individuals in different countries. The value of the PPP poverty line is calculated based on the prices of goods and services in these countries.

Based on figures released by the Central Bureau of Statistics in Graph 1, the poverty rate in Indonesia continues to experience a downward trend from year to year in line with various

policies carried out by the Government. In 2014 poverty in Indonesia of 11.25 percent continued to decrease until 2019 to 9.41 percent. However, in 2020 because Indonesia was also affected by Covid-19 in all sectors, which resulted in the poverty rate increasing to 9.78 in 2020 and 10.14 in 2021. Furthermore, in 2022, the poverty rate began to decline in line with Indonesia's success in handling Covid-19. Despite the trend of progress in reducing poverty, there are still many people living below the poverty line. The Indonesian government has made various efforts to overcome the problem of poverty. Programs such as the Smart Indonesia Card (KIP), Non-Cash Food Assistance (BPNT), and Family Hope Program (PKH) have been launched to provide direct assistance to poor families (Bappenas, 2019). In addition, economic development programs in rural areas and skills training are also implemented to increase employment opportunities for the poor. Despite efforts, challenges in reducing poverty in Indonesia remain. Cooperation between governments, communities, and the private sector is needed to address this problem. Sustained efforts to improve infrastructure, improve access to education and healthcare, and create better job opportunities, can help reduce poverty in Indonesia.



Graph 1. Percent of Poverty in Indonesia 2014 - 2022

In addition to the level of poverty described above, what is even more crucial is extreme poverty or very poor people. The World Bank does not use a single formula or a specific formula to measure extreme poverty. However, it uses international standards in measuring extreme poverty based on the international poverty line. To date, the most common international poverty line used by the World Bank is the international poverty line of \$1.90 per day on a purchasing power parity (PPP) basis. That is, individuals living on less than \$1.90 per day (in PPP) are considered to be living in extreme poverty. Purchasing Power Parity (PPP) is an international price index measured by the amount of money needed to buy the same basket of goods in each country compared to the US \$.

Extreme poverty can be defined as people who are very poor and urgently need assistance from the government because they are trapped in a cycle of poverty. Poverty cycle is a term that describes a cycle or trap of poverty that is difficult to get out of. This term describes a situation in which individuals or families are trapped in poverty and find it difficult to improve their economic conditions. The cycle of poverty often involves factors that are interconnected and influence each other. Vicious circle of poverty when a person lives in poverty, access to quality education may be limited, which in turn can affect future employment opportunities and income.

2. MATERIALS AND METHODS

This study uses secondary data derived from National Socioeconomic Survey (SUSENAS) data obtained from the Central Statistics Agency (BPS) in 2022 with sample data from the Yogyakarta Special Region Province. The operational variables used in this study are independent variables and dependent variables. The dependent variable is the economic status of households, namely extreme poor households that have a per capita expenditure per day of Rp. 10,739, - according to World Bank calculations, namely those who live below US \$ 1.9 PPP per capita per day. The second dependent variable is the status of poor households that have expenditures below the absolute poverty line. As for the independent variables, it uses variables of the characteristics of the Head of Household (KRT), namely gender, average length of schooling, unemployment rate, PKH subsidy recipients, BPJS PBI participation,

disability, uninhabitable houses, chronic diseases, toddler ownership and access to micro funds.

The difference between our research and the previous study is in terms of locus, namely in DIY with the number of variables we examined as many as 10 variables using logistic regression and using National Socioeconomic Survey (Susenas) data sourced from BPS. The variables we examined were divided into 3 types, namely demographic variables, intervention variables and control variables. Economic modeling using logistic regression can be done by taking into account various factors that influence a particular event. The logistic regression model makes it possible to see the magnitude of the probability of an event by taking into account the variables that affect it. This model is not linear, so it is necessary to perform logit transformations to create linear functions in its parameters, which make it possible to interpret the relationship between explanatory variables and the probability of a particular event.

Empirical studies on the relationship between female heads of household and poverty rates show that in some contexts, households led by women have lower poverty rates compared to households led by men. For example, in Cambodia, data from CSES 1999 showed that the poverty rate among households led by women was 48 percent, while for households led by men was 52 percent Haughton and Khandker, [1] Khandker et al., (2009). This suggests that targeted interventions based on the sex of the head of household may not be effective in differentiating poverty levels. In addition, regression analyses separating the effects of urbanization suggest that higher income levels in female-led households may not be the result of women's leadership itself, but due to other factors such as urban location Nasir Iqbal and Masood Sarwar Awan, (2015); Rachmavati, (2021); Rootman, (2019).

However, it is important to note that the relationship between female heads of household and poverty rates can vary depending on socio-economic and geographical contexts. Another study in Indonesia found that household size, head of household's education, and head of household's employment status have a significant influence on the likelihood of poor households, demonstrating the complexity of factors affecting poverty that goes beyond the

gender of the head of household alone Alfi and Halwati, [2], Suryadi, (2022). Empirical evidence points to a strong and significant relationship between unemployment and poverty, confirming the importance of policies aimed at reducing unemployment as a way to reduce poverty.

Empirical studies show a significant relationship between education level and poverty rate. Research conducted Cahyani et al., [3], Findi et al., (2010); Ortega and Sanjuan, (2014); Sukmana, (2017); Utariyanto et al., (2020) It found that education has a negative influence on poverty, meaning the higher a person's level of education, the lower their likelihood of living in poverty. Numerous studies have shown that education can reduce poverty through increased income and better employment opportunities. For example Khan et al., [4] It found that higher levels of education were associated with poverty reduction, with individuals with secondary education and above tending to be wealthier than those with primary education or below. Other studies by Lameck Lupeja and Gubo, [5] in Tanzania shows that secondary education can help reduce poverty by obtaining better jobs and more prosperous lives. In addition, further analysis showed that higher levels of education correlated with increased life satisfaction, especially in rural areas where education was recognized as an important tool for reducing poverty Spada et al., [6]. Research in different countries shows a link between education levels and income inequality, affirming the importance of education in reducing poverty and improving well-being Shi and Qamruzzaman, [7]. Investment in education is a critical instrument for preventing and reducing poverty, with education serving as a means to increase individual productivity and income, which in turn contributes to poverty reduction in society.

Empirical studies of the relationship between unemployment and poverty rates show a significant positive correlation between the two variables Alisjahbana and Manning, [8]. Gasparini and Marchionni, (2017); Hidayat et al., (2020); Sibel and Gülay, (2011); Sosial, (2020). In research conducted by Ochi, [9], it was found that the coefficient of unemployment rate is always positive and significant at significance levels of 1% and 10%, confirming that unemployment is one of the main causes of poverty in sub-Saharan African countries. This suggests that the farther an individual is from work, the higher his poverty rate, which

underscores the importance of differentiated employment policies to reduce unemployment. In addition, another study conducted in Indonesia found that the relationship between unemployment and poverty rates was the strongest in the model they used, with a large slope coefficient and positive direction. This shows that when the unemployment rate increases by 1 percent, then the poverty rate will also rise by 0.599 percent. This finding provides information related to the productivity of Indonesian people, where if people are productive enough, they will not immediately fall into poverty when they lose their jobs. They will look for ways to make money to meet at least their daily needs. This strong relationship shows that when someone loses their job in Indonesia, they also lose income completely because there was nothing they did to create a temporary side income before getting a new job Alisjahbana and Manning, [8]. Lubis et al., (2022); Oktafianto et al., (2019); Sosial, (2020).

The marginal effect refers to the expected change in the dependent variable (e.g., the probability of being poor) for every change of one unit in the independent variable, assuming the other variable remains constant. In the context of poverty analysis, marginal effects can be used to assess how factors such as the sex of the head of household, the number of dependents of the household, land ownership, and the education level of the head of the household affect the likelihood of the household becoming poor. For example, the marginal effect of head of household education on the likelihood of household poverty may indicate how much the likelihood of poverty decreases with an increase of one year of head of household education, assuming other factors remain the same. Before conducting a comprehensive analysis, an empirical analysis of socioeconomic conditions can be carried out on the tendency to plunge into extreme poverty and absolute poverty.

Female heads of household are often considered to have a higher tendency to be poor compared to male heads of household. This can be attributed to a variety of structural and social factors, including limited access to economic resources, lower employment opportunities, and greater responsibility in childcare and unpaid domestic work. In addition, female heads of household may also face gender discrimination at work and in access to financial services, all of which can increase

their vulnerability to poverty [10] United Nations, 2022; Utariyanto et al., 2020). However, it is important to note that specific contexts and local conditions can influence these dynamics, and not all female heads of household are automatically at higher risk for poverty.

Empirically, the average length of schooling has a negative relationship to the probability of poverty. That is, the higher the average length of schooling of the head of the household, the lower the probability of the household to be poor. This is supported by research showing that improved education of heads of household can reduce the likelihood of households becoming poor. For example, an increase in education from primary to secondary, secondary to undergraduate, and so on, can significantly reduce the likelihood of being poor by 38%, 70%, 79%, 92%, and 96% respectively compared to the reference category of primary education [11,12]. This suggests that education has a strong effect in reducing poverty, with increasing education each year potentially reducing poverty. The average years of education among the households studied were 11 years, suggesting that most of the population only achieved the level of complete secondary school education; On average they obtained 8.95 years of education, with a standard deviation of 4.97 years [13], (Quispe-Mamani et al., 2022). It emphasizes the importance of education in influencing the poverty status of households.

By Adji et al., [14] and a study conducted by TNP2K, (2022) The unemployment rate has a significant relationship to extreme poverty. An increase in the unemployment rate can lead to an increase in the number of people living below the extreme poverty line due to lack of access to a stable source of income. When individuals lose their jobs or are unable to find work, they and their families become more vulnerable to conditions of extreme poverty, defined as living on expenses below \$1.9 per day according to purchasing power parity (PPP). This is exacerbated in regions with already high levels of poverty and extreme poverty, where access to decent work and stable incomes is critical to reducing poverty.

Conditional cash transfer program (*Conditional Cash Transfer*) designed to alleviate poverty by providing cash payments to target households provided they meet certain criteria, such as

ensuring their children attend school or receive vaccinations (Fernando and Nicolas, 2009; Patel-Campillo and García, 2022). According to Baird et al., [15] Nugroho et al., (2021); Resina et al., (2023) The program aims to reduce poverty by providing financial support and encourage long-term human capital development by incentivizing behaviors that lead to better education and health outcomes. CCT has been implemented in various countries and has proven effective in increasing school attendance, improving health outcomes, and lifting households out of poverty through empowering MSMEs. One of the programs implemented by the government is the family hope program (PKH)

According to Studies conducted Angrist et al., [16] dan Henry, (2022), the implementation of JKN acts as a social safety net that supports poor and vulnerable families in changing their social conditions. Especially in regions such as sub-Saharan Africa, JKN implementation plays an important role in poverty alleviation efforts. To ensure targeted benefits, social safety net programs such as JKN require effective targeting methodologies. One commonly used method is livelihood testing to identify eligible families. Thus, JKN has an important role in ensuring that all people have equal access to health services and preventing them from being trapped in poverty. Cash health payments (*Out of Pocket*) can significantly burden households' finances, potentially pushing them into extreme poverty. It is estimated that globally, around 70 million people are pushed into extreme poverty, with another 435 million pushed deeper into extreme poverty due to cash health payments [17,18] Noviani, 2021; Yang and Hu, 2022). This underscores the importance of JKN in protecting households from financial risks associated with healthcare access, thus contributing to poverty alleviation.

The ownership of BPJS PBI (Contribution Assistance Recipients) has an important role in efforts to alleviate poverty. This program is designed to provide health protection to the poor and underprivileged, so that they can access health services without worrying about costs (Pratiwi et al., 2021; Rolindrawan, 2015; Verguet et al., 2021). By ensuring that poor families have access to good healthcare, BPJS PBI helps prevent acute poverty caused by unpredictable and high health costs. This is in line with the goals of universal health coverage (UHC) and Presidential Decree of the Republic of Indonesia

No. 72 of 2012 which aims to ensure everyone can access the healthcare they need without experiencing financial hardship. Through the provision of social assistance and social protection such as BPJS PBI, the government seeks to reduce the burden of expenditure and increase access to health services for the extreme poor, as part of its poverty reduction strategy.

According to Kiani, [19] and Rahman, (2013) Disability conditions increase the risk of poverty due to several interrelated factors. First, if the head of the household is disabled, it exacerbates family poverty due to increased costs associated with medical care and needs, lack of income from the primary breadwinner, and reduced opportunities due to social exclusion. In addition, the presence of members with disabilities in a household requires significant care, which often reduces labor market participation for caregivers. This results in a high opportunity cost in terms of lost income, so households with members with disabilities are less likely to live in poverty [18]; Noviani, 2021; Yang and Hu, 2022). In addition, households with members with disabilities are more likely to live in poverty than households without members with disabilities, as disabilities cause additional financial burdens and barriers to employment and education, further exacerbating the cycle of poverty.

Furthermore, uninhabitable housing significantly contributes to extreme poverty. Living in uninhabitable homes, such as homes that lack basic sanitation, safe construction, or access to utilities, exacerbates the challenges faced by the very poor. This condition not only affects the physical health of the population by increasing their susceptibility to disease, but also impacts their mental well-being and social opportunities [20] Nisa' et al., 2023; Rosa, 2013). The lack of a stable and safe living environment can hinder access to employment and education, further exacerbating poverty. As per the case study in Banjarmasin City, the prevalence of uninhabitable houses is still a major issue, with a significant percentage of houses not meeting an adequate standard of living, thus contributing to the cycle of poverty [21].

Meanwhile, ownership of toddlers in a family can increase the risk of poverty. Families with toddlers often require additional resources to meet basic needs such as nutrition, health, and early education. This can increase the economic

burden on families, especially for those who are below the poverty line or have limited incomes, thus exacerbating the poverty situation. In addition, the need for intensive care and care for toddlers can also limit the ability of family members, especially mothers, to work or increase their income, thus deepening the family's poverty conditions [22], (Suryana and Azis, 2023; Wahyudi et al., 2023).

The condition of debt or loans provided by microfinance can have two blade conditions, depending on where the flow of funds is utilized. If the utilization of loans is used to support productivity, it will be directly proportional to the increase in welfare (*well being*). Meanwhile, in other conditions there is a *behavior* Where credit is used to fulfill household consumptive desires that are influenced by social and environmental conditions, which is in line with theory Varian, [23] about *law of small numbers* or *monte carlo fallacy* Where this is one of the phenomena in statistics that illustrates that the habits carried out by the general community were initially influenced by small groups. Everyone wants to achieve financial well-being, even Mokhtar et al., [24], Morris et al., (2022); PORTER and GARMAN, (1992) It has a definition whereby an individual has a level of satisfaction with their monetary situation. However, based on the studies conducted Financial Services Authority, [25-27] regarding the Indonesian Financial Literacy Strategy 2021 – 2025, more precisely in the Special Region of Yogyakarta, the financial literacy index is 54.55 while financial inclusion is 82.08. Based on this, it can be concluded that there are still many people who access financial services without having good financial insight. This can undermine financial well-being and will tend to plunge into poverty and extreme poverty.

3. RESULTS AND DISCUSSION

The results of the analysis will be divided into three locations, namely at the provincial, urban, and rural levels, where in each location will be analyzed the determinants of household characteristics to vulnerability to extreme poverty based on the World Bank poverty line of 1.9\$ per capita per day (according to *Purchasing Power Parity*) and absolute poverty based on poverty line figures constructed based on the accumulation of food and non-food poverty lines. Furthermore, a comprehensive comparison of the influence of each predictor variable on response variables will be analyzed [28-30].

Table 1. Marginal effect economic model of extreme and absolute poor households

VARIABLES	(1) DIY PPP	(2) DIY Poor	(3) Urban PPP	(4) Urban Poor	(5) Rural PPP	(6) Rural Poor
Sex	0.0257*** (0.00133)	0.0302*** (0.00119)	0.0163*** (0.00125)	0.0264*** (0.00123)	Omitted	Omitted
Yos	-0.000661*** (3.93e-05)	-0.00295*** (7.21e-05)	-0.000815*** (9.53e-05)	-0.00350*** (8.21e-05)	-0.00242*** (0.000174)	-0.00123*** (0.000197)
Employed	-0.00701*** (0.000178)	-0.000643** (0.000262)	-0.00778*** (0.000308)	0.00112*** (0.000315)	-0.0167*** (0.000620)	-0.00302*** (0.000651)
PKH	-0.000612 (0.000390)	0.0239*** (0.000736)	-0.0133*** (0.000824)	0.0319*** (0.000873)	0.00819*** (0.00156)	-0.00353* (0.00198)
PBI	0.00801*** (0.000504)	0.0200*** (0.000878)	Omitted	0.0149*** (0.000981)	-0.0121*** (0.00192)	0.0418*** (0.00269)
Disable	0.00872*** (0.000696)	0.0257*** (0.00223)	Omitted	-0.00581 (0.00381)	0.0322*** (0.00283)	0.0878*** (0.00393)
Unsuitable House	0.0215*** (0.000467)	0.0602*** (0.000854)	0.0288*** (0.000831)	0.0667*** (0.000960)	0.0416*** (0.00190)	0.0534*** (0.00259)
ChronicHealth	0.000825** (0.000408)	-0.0158*** (0.00104)		-0.0250*** (0.00139)	0.0197*** (0.00154)	0.00804*** (0.00205)
Baby	0.00954*** (0.000306)	0.0308*** (0.000654)	Omitted	0.0103*** (0.000870)	0.0362*** (0.00113)	0.0764*** (0.00156)
MicroFinance	0.00557*** (0.000713)	-0.0518*** (0.00281)	Omitted	Omitted	0.0318*** (0.00266)	-0.0193*** (0.00419)
Observations	327,854	327,854	86,760	237,607	67,709	67,709

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The tendency of female heads of households to fall into poverty based on the results of probability analysis in the Special Region of Yogyakarta has a 3% chance of falling into absolute poverty and 2% of falling into extreme poverty. According to where he lives, this condition tends to occur in urban areas rather than rural areas, this is in line with Adji et al., [14] Sugiharti et al., (2022); Turay, (2021), where there is still a lot of income inequality in urban areas for female workers rather than men, based on this can be the tendency of female heads of households to fall into poverty can be used as a reference.

Furthermore, based on the average length of schooling of household heads, based on the results of the table analysis, it is stated that the tendency to reduce poverty is higher in rural areas to reduce extreme poverty, which is 0.3%. Based on this, it can be concluded that the average length of schooling in rural areas is lower than in urban areas, besides that the quality of education in rural areas still cannot facilitate well in supporting quality education and improving the capabilities of human capital.

According to the general unemployment rate, if a poor household has a permanent job, it will reduce the tendency to plunge into extreme poverty by 2%, but it is still not necessarily applicable to absolute poverty. This is because absolute poverty still pays attention to whether the head of the household works in the formal or informal sector. This is in line with the findings of absolute poverty in urban areas that still cannot reduce the poverty rate. Therefore, it can be noted that in urban areas there are still many heads of households who work in the informal sector so that their consumption is still below the poverty line.

According to the level of ownership, the social safety net for extreme poor and absolute poor households that is most efficient in reducing poverty levels in the Special Region of Yogyakarta, more precisely in urban extreme poverty and absolute poverty in rural areas is the PKH program. This program is intended as one of the main components assisted by this program with regard to education. It is hoped that this education fund distribution assistance can provide opportunities to PKH recipients with expectations of increasing capacity and quality through human resource investment. Technically, the *output* of the determinants of the PKH program, and PBI has endogeneity between

variables, this is reinforced according to the results of the determinants of PBI ownership inversely proportional to the PKH program. PKH beneficiaries can reduce the chances of extreme poor households by 0.18%, while those in urban areas with scavengers reduce the extreme poor status by 2%, but it does not apply to rural areas.

For health beneficiaries, namely PBI from the government, it appears that PBI ownership increases the chances of absolute poverty by 1.36% and 0.6% for extreme poor. This indicates that health problems are a very basic problem experienced by the poor and extreme poor. Receiving aid alone still has the opportunity to fall into poverty, especially if you do not receive health assistance. But it is different with the extreme poor who live in rural areas. PBI recipients have the opportunity to reduce extreme poverty by 1.11%.

Disability conditions can be assumed that for households that have household members who have cognitive impairments and are difficult to move, the level of consumption will be higher than households in general. The high financial burden is likely to further trap households into poverty and even extreme poverty. Based on the results of the analysis above, this phenomenon has a positive tendency towards extreme poverty and absolute poverty even in rural areas has a tendency to plunge into poverty. Unlike urban areas negatively affecting absolute poverty, this can be realized with conditions of inclusiveness in urban areas that support people with disabilities.

Households with chronic illnesses have a probability of being trapped in extreme poverty and absolute poverty in urban areas. But the rest negatively affect the tendency to plunge into poverty zones.

Ownership of toddlers has a positive effect on the status of poor and extreme poor because ownership of toddlers causes an increase in household expenditure. From the table, it can be said that under-five ownership has the opportunity to increase extreme poverty by 1.03% and 3.27% absolute poverty. Rural areas of under-five ownership are particularly vulnerable to adding to extreme poverty.

Access to microfinance institutions, be it access to credit, KUR etc., greatly affects poverty. At absolute risk, households that have accessed financial institutions have a

5.29% chance of reducing absolute poverty. This is different for extreme poor households which can actually increase extreme poverty by 0.67%. This indicates the need for assistance in the use of these credits, especially in rural areas so that their use is appropriate and directed.

4. CONCLUSION

The demographic variables of extreme poor households represented by the variables of the sex of the head of household, average length of schooling, unemployment rate, disability and ownership of toddlers had a significant effect, while for chronic disease variables did not have a significant effect. This is different for urban areas, the only significant variables are the sex of the head of household and the unemployed. As for rural areas, all demographic variables are influential except for the gender of the head of household. The intervention variables of extreme poor households represented by PKH and BPJS PBI DIY recipients have a significant effect both in urban and rural areas. The control variables of extreme poor households represented by uninhabitable homes and access to DIY microfinance had a significant effect. It also affects both urban and rural areas. For further research, you can use new data Survey Socio Economic National (SUSENAS) and Socio-Economic Registration (Regsosek) data which has a wider scope (census scale) where the data is in TNP2K and Setwapres (Secretary of the president).

References must be listed at the end of the manuscript and numbered in the order that they appear in the text. Every reference referred in the text must also present in the reference list and vice versa. In the text, citations should be indicated by the reference number in brackets [3].

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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