

# Poverty Dynamics in Indonesia: The Prevalence and Causes of Chronic Poverty

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# Poverty Dynamics in Indonesia: The Prevalence and Causes of Chronic Poverty

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## Abstract

This study aims to determine the chronicity of poverty in Indonesia using the equally distributed equivalent (EDE) poverty gap method, tracking Indonesian households in 2007 and 2014. The results indicate that the largest component of poverty among households was chronic (77%). Compared to transient poverty, chronic poverty is more common across individuals. Unlike previous studies, we used data at the district level to measure the poverty line, discovering that the cost of poverty inequality is lower than often reported. This decision is because disaggregated data (poverty line) can show a more realistic poverty threshold. Using a quantile regression approach, we found evidence that age, gender, employment status, and education were significant factors of chronicity. Other significant factors of chronic poverty include large household size, having no access to services (finance, electricity, information, and mobility), and having limited or no assets. Casual employment in the agricultural sector and living in rural areas increase the probability of poverty, although not necessarily chronic. Poverty alleviation programs, therefore, need to target the right causes as exposure to poverty varies across households.

## Keywords

Chronic poverty; economic inclusion; EDE poverty gap; Indonesia; poverty eradication; poverty line; quantile regression; social welfare; urban poverty

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## Introduction

Poverty remains a problem worldwide and continues to be a priority in the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs). Following the Proclamation of Indonesian Independence in 1945, most households were considered poor in Indonesia. In the 1960s, the country was at the border of 'chronic economic dropout' (Booth, 1992). Since then, the government has rolled out various programs to reduce poverty, initially as part of the Eight-Year National Development Plan in the 1960s (Penasbede); and carried on as part of the New Order's the Five-Year Development Plan in 1969–1994 (Repelita I to VI). From 1994 to 2007, the long-term effort successfully alleviated 85% of poverty (Dartanto & Otsubo, 2016; Miranti, 2010). From 2007 onwards, similar programs have further reduced the poverty index to below 10% (Muryani & Esquivias, 2021). Indonesia Vision 2045 aims at total poverty eradication by 2045.

However, poverty in Indonesia is rooted in complex socioeconomic problems, suggesting the need for dynamic methods to study poverty. Longitudinal calculations help describe poverty more comprehensively by examining the degree of deprivation and the dimensions (Todaro & Smith, 2012, p. 231). This approach aims to differentiate poverty levels into transient and chronic, each of these two states of poverty requiring different strategies and policy responses (Barrientos et al., 2005). Chronic poverty is characterized mainly by a permanent state of deprivation, often resulting from socioeconomic failures (Punton & Shepherd, 2015). Chronic poverty is more effectively overcome by policies that aim to increase or restore human capital and physical assets. Meanwhile, temporary or transient poverty can be tackled more effectively by insurance provision and income stabilization (Lipton & Ravallion, 1995, pp. 62–69).

Evidence for poverty measurements in Indonesia is mixed (see Table 1). Several studies claim that transient poverty is substantially larger (Akita & Dariwardani, 2013; Dartanto & Nurkholis, 2013; Widyanti et al., 2009). Results may have been partial as these studies applied components approach, SPELL approach, or headcount ratios—recent studies using the equally distributed equivalent (EDE) approach claim that chronic poverty is more prevalent. For example, Mai and Mahadevan (2016) found that, on average, 76% of poverty is chronic. Others suggest similar estimates, although employing data in short periods (Muryani & Esquivias, 2021) or resulting in unlikely large estimates (Purwono et al., 2021). Therefore, further research is needed. One specific aspect that explains differences in poverty estimates is the poverty line definition. We refrain from defining the poor as a single homogenous group whose earnings are below an international, national, or provincial poverty line. While those poverty lines are useful for comparative purposes (e.g., across countries or provinces), it limits our understanding of poverty in a country where poverty levels are non-homogeneous. We adopt local poverty lines (city or regency level) to capture poverty levels better and provide new poverty estimates.

In calculating the state of poverty, SPELL and component approaches are the most commonly used in Indonesia (Akita & Dariwardani, 2013; Alisjahbana & Yusuf, 2003; Dartanto & Nurkholis, 2013). However, the EDE estimation has advantages over the other approaches. Mai and Mahadevan (2016) pointed out that EDE can decompose poverty into the average poverty gap and the cost of inequality between individuals—an essential aspect in formulating an effective poverty reduction strategy. Additionally, EDE considers extreme income shocks that may convolute poverty calculation. For example, an individual who experiences severe poverty

during a period of  $t-1$  could be regarded as non-chronic if his income during period  $t$  is large enough to be deemed above the poverty line. The EDE provides a framework to avoid bias arising from using longitudinal data (multiple waves).

This study estimates total and chronic poverty using longitudinal data at the household level originated from the Indonesia Family Life Survey (IFLS) in 2007 and 2014. To estimate poverty dynamics, using EDE, the results are disaggregated into a chronic poverty profile in Indonesia, providing deeper insights at an individual or household level in three dimensions; economic, social, and demographic. Following quantile regression by Bayudan-Dacuycuy and Lim (2013), chronic poverty estimations could be coupled with an empirical test of the role of socioeconomic and demographic aspects in households. This is to find out if there are links between these variables and the chronicity in the four quantiles (25%, 50%, 75%, 100%). Specifically, we investigate whether economic aspects like employment type, ownership of assets, access to services (finance, transportation, electricity, and communications) have bearings in the chronicity. Similarly, socioeconomic and demographic aspects, i.e., gender, age, family size, and rural-urban location, are also examined.

## Literature review

### Chronic poverty

From an income-expenditure point of view, poverty can be defined as the inability to satisfy basic material needs (food and non-food). The minimum average monthly per capita expenditure is often used as a poverty line, drawn at a global, national, regional, or smaller scale. In a more general view (non-monetary), poverty also considers the conditions where households or individuals cannot fulfill education, health, human and civil rights. Severity-wise, people can be temporarily deprived or be permanently (habitually) in poverty (unable to meet basic needs and rights). It is crucial to distinguish the type of poverty individuals experience since the approach to combat every kind of poverty will be different. Chronic and transient poverty, for instance, is driven by other factors (Bayudan-Dacuycuy & Lim, 2013).

Chronic poverty (persistent stage) occurs when people experience substantial “capability deprivation” (Hulme & Shepherd, 2003) related to income, assets, nutrition, access to services, among others. Chronic poverty is characterized by sustained deprivation over a long period – often more than five years (Hulme et al., 2001); and is often associated with economic and social failures (Punton & Shepherd, 2015; Todaro & Smith, 2012). Lack of access to services in education or health, poor connectivity, remoteness, social-economic exclusion can often drive chronic poverty. A significant concern is that individuals or households that have been poor for an extended period are more likely to remain poor (Corcoran, 1995). By contrast, transient poverty occurs in specific periods and can last relatively short. Health conditions, job status, disasters, price shocks, drop in income, or unseen financial needs can explain transient poverty (Bayudan-Dacuycuy & Lim, 2013; Noerhidajati et al., 2020).

In terms of scale, poverty can be categorized into three primary levels: regional, community, and household or individual (Haughton & Khandker, 2009, pp. 145–156). In Indonesia, estimates of



poverty across provinces and poverty estimates for developed and underdeveloped areas have been explored (Mai & Mahadevan, 2016), as well as the rural-urban gap (Dartanto & Nurkholis, 2013; Wardana & Sari, 2020). Studies revealed that rural areas experience more poverty (De Silva & Sumarto, 2015) or face a higher risk of falling into poverty (Akita & Dariwardani, 2013). At the household level, studies in Indonesia identified that larger households led by individuals with low education are prone to poverty (Akita & Dariwardani, 2013; Bella & Dartanto, 2018; Widyanti et al., 2009); and so are female-led households (Muryani & Esquivias, 2021), as women are less likely to take part in the labor market (Schaner & Das, 2016). Lack of access to services, health insurance, and limited ownership of assets can also lead to poverty at different regional and household levels (Dartanto et al., 2020; Taufiq & Dartanto, 2020).

## Poverty calculation approaches

Previous studies in Indonesia have employed the SPELL approach, component, or headcount ratios to estimate poverty levels, revealing more transitory than chronic poverty. For instance, the degree to which chronic poverty's economic, demographic and social aspects may have been underestimated. While improvements in education and access are often found to help reduce transient poverty, little has been said on how they work in lifting people out of chronic poverty.

Previous studies on poverty dynamics have found mixed evidence on chronic and transient poverty proportions using longitudinal and panel data in Indonesia. Two primary data sources are used in Indonesia: the National Socio Economy Survey (Survei Sosial Ekonomi Nasional or Susenas by Statistics Indonesia) and the IFLS (Indonesian Family Life Survey) longitudinal dataset. Table 1 lists the primary studies for chronic poverty, the poverty approach employed, and the data source. <sup>31</sup>

Most recent studies in Indonesia use the SPELL approach to estimate chronic poverty, resulting in different levels such as 28% (Dartanto & Nurkholis, 2013), 12% (Dartanto et al., 2020), and 29.21% (Alisjahbana & Yusuf, 2003). Meanwhile, a component approach study resulted in 17.33%. Purwono et al. (2021) estimated chronic poverty in 2008 and 2010 at 28.28% and 47%, respectively, using the SPELL approach and component approaches. However, studies using EDE to compare previous estimations found substantial differences in the results. Mai and Mahadevan (2016) used IFLS data of four waves (covering 1993 to 2007) and found that chronic poverty in Indonesia was 76%. More recent estimates (Purwono et al., 2021) even proposed chronic poverty of nearly 92% – an approximation that is distant from the official national figures on poverty. <sup>3</sup>

While several studies have estimated poverty levels in Indonesia and examined social, economic, and demographic factors, the vast differences in poverty estimates suggest the need for additional studies using different approaches. Furthermore, previous regression techniques to estimate determinant factors mainly employed Sigmoid function (Probit, Logit, Tobit, or extensions like order Logit models, see Table 1). Logit-Probit approaches assume similar marginal effects among households categorized as poor and under specific socioeconomic aspects, which is unlikely. As an alternative, we first estimate poverty levels using EDE and subsequently estimate potential determinants using quantile regression (Bayudan-Dacuycuy & Lim, 2013; Jalan & Ravallion, 2000). Additionally, we incorporate poverty lines at the district level, which is a more realistic measurement of poverty (Aginta et al., 2021; Hanandita & Tampubolon, 2016), compared to the

provincial level used in most studies in Table 1. This makes our study substantially different from earlier attempts that estimate poverty and its determinants.

In chronic poverty analysis, quantile regression has advantages over classical and Tobit regression. Classical regression requires several assumptions that must be fulfilled. If classic assumptions are not met, the results obtained may be inefficient. In contrast to ordinary regression, quantile regression analysis does not require parametric assumptions in estimation (Buhai, 2005). However, in the context of Indonesia, Logit, Probit, and Tobit regression have been widely used to analyze the dynamics of poverty. Jalan and Ravallion (2000) have demonstrated a fragility of error distribution in Tobit regression that is not normal and not independent. The fragility of the Tobit regression was then improved by developing a quantile regression method (Jalan & Ravallion, 2000).

Quantile regression is not affected by outliers, which can disturb the stability of the data (Furno, 2007). However, a bias in estimation can arise due to limited observation periods (Duclos et al., 2010). Potential errors in quantile regression can be cleared by using the bootstrap method (Hahn, 1995). The bias correction approach can correct the standard error by obtaining estimates from a random sample to build a population different from the original data (Wooldridge, 2012, pp. 225–226). This method can estimate various types of statistical quantities or can form confidence intervals by referring to specific algorithms (Oktafia et al., 2016).

## Socioeconomic and demographic profiles

It is feasible that specific individuals may suffer deprivation because of gender, age, education, socioeconomic status, location, and other factors. It is beneficial to detect communities, social groups, or regions where deprivation is concentrated. Earlier studies in the Indonesian context have also highlighted essential aspects. First, the gender gap remains an issue, and women are more prone to poverty; and have fewer opportunities in the labor market (Taniguchi & Tuwo, 2014). In terms of geographic locations, Moeis et al. (2020) emphasized that moving labor from rural to urban areas could be an effective way to lower poverty in the past, but it does not work in recent years. Besides, female participation in labor in rural areas has decreased (Schaner & Das, 2016), suggesting that new gaps in poverty and welfare have emerged in rural areas.

Third, the role of education remains unclear. Mai and Mahadevan (2016) identified that the most significant cause of chronic poverty is the cost of inequality, evident across the least and most educated heads of households. Providing primary education may not be enough to bring people out of poverty. Fourth, employment status can also be a driver; for instance, those working in agricultural sectors under informal and casual employment are more likely to face poverty (Dartanto et al., 2020; Moeis et al., 2020; Taufiq & Dartanto, 2020). People with a low education level and females are also more vulnerable (Schaner & Das, 2016, 2016; Taniguchi & Tuwo, 2014). For instance, policies to provide more jobs alone may not be enough. Skill development, female-friendly labor schemes, inclusive jobs (Bella & Dartanto, 2018), and more flexibility in the labor market seem crucial to bringing people out of poverty.

Our study aims to contribute to the literature on such aspects, highly relevant to the Indonesian poverty alleviation challenge. Our main contribution is to provide estimates using poverty line

measures at a lower level of aggregation (regency and city), employing the EDE approach to re-estimate chronic poverty, and using a quantile approach to test whether social, economic, and demographic aspects are relevant to chronic poverty at different distribution levels.

**Table 1:** Previous Studies Measuring Chronic Poverty in Indonesia

Reference	Poverty Approach	Data Period and Source	Chronic Poverty (%)	Socio-Economic Dimension	Estimation
Purwono et al. (2021)	EDE SPELL Component	Susenas 2008, 2010	92% (EDE) 28.28% (SPELL) 47%-63%	-	-
Muryani and Esquivias (2021)	EDE	Susenas 2010	72%	Gender, Education, Health Insurance, Household Size, Credit	Tobit
Dartanto et al. (2020)	SPELL (FGT)	IFLS 1993, 1997, 2000, 2007, 2014	11.9%	Education, Household size, Occupation, Assets, Sickness	Ordered Logit
Wardana and Sari (2020)	EDE	Susenas 2008, 2010	78%	Education, Household Size, Rural-Urban, Credit, Occupation, Health Insurance	Tobit
Moeis et al. (2020)	SPELL	IFLS 2000 - 2014		Occupation, Urban-Rural, Assets, Education, Location, Electricity Access	Ordered Logit
Taufiq and Dartanto (2020)	Headcount ratios	Susenas 2011, 2013	2.65%	Education, Age, Gender, Household Size, Urban-Rural, Working Status, Electricity	Ordered Logit
Dartanto and Otsubo (2016)	SPELL (FGT)	IFLS 1993, 1997, 2000, 2007	Less than 3% (Poverty mainly Transient)	Education, Household Size, Distance to Public transport, Assets	Logit and Ordered Logit
Mai and Mahadevan (2016)	EDE	IFLS 1993, 1997, 2000, 2007	76.0	Region, Religion, Education	-
Akita and Dariwardani (2013)	Headcount ratios, FGT	Susenas 2008, 2010	34.7%	Age, Education, Household Size, Urban-Rural, Regions	Probit
Dartanto and Nurkholis (2013)	Headcount	Susenas 2005 - 2007	28%	Education, Household size, Employment, Assets, Credit Access, Job Status, Electricity, Region	Ordered Logit
Widyanti et al. (2009)	Headcount, FGT	IFLS 1993, 1997, 2000	40.98%	Household Size,	Ordered Probit
Alisjahbana and Yusuf (2003)		IFLS 1993, 1997	29.21%	Urban-Rural	Logit

Note: FGT (Foster-Greer-Thorbecke, poverty indices), SUSENAS (Survei Sosial Ekonomi Nasional by Statistics Indonesia), IFLS (Indonesian Family Life Survey), (EDE) equally distributed equivalent.



## Data and methodology

### Data and sources

This study uses the Indonesian Family Life Survey (IFLS) provided by the Rand Corporation. This dataset is longitudinal at the individual, household, and community levels. The IFLS includes social life, economy, health, and behavior and represents 83% of the Indonesian population. This study uses two survey periods (2007 & 2014), with 12,779 households observed in each period. Although IFLS has five available waves of data (between 1993 and 2014, where individuals are tracked throughout the period), we focus on the last two waves as data to measure poverty lines at the district level is available only for the 2007 and 2014 timeframes. We update district poverty lines from the Indonesia Database for Policy and Economic Research (INDO-DAPOER). The provincial coverage in this study is: North Sumatra (7.6%), West Sumatra (4.8%), South Sumatra (4.7%), Bengkulu (4.2%), Lampung (0.6%), Riau (1%), Jambi (0.1%), Riau Islands (0.1%), Banten (4.2%), DKI Jakarta (7.3%), West Java (16.3%), Central Java (13.2%), DI Yogyakarta (5.8%), East Java (15.1%), Bali (5.2%), West Nusa Tenggara (4.6%), Central Kalimantan (0.1%), South Kalimantan (2.4%), East Kalimantan (0.2%), and South Sulawesi (2.4%).

**Table 2:** List of Variables (Head of Household Characteristics)

Variable	Description
$\beta_1, \beta_2, \dots, \beta_{18}$	Independent variable regression coefficient
$i$	Household to $i$
$t$	Year (2007 or 2014)
Gender	Dummy variable for the gender of the head of the household (1: male; 0: female)
Age	The age of household head
Edu	Highest education of household head completed (1: Elementary School or below, 2: Junior High school, 3: Equivalent to Senior High school, 4: Undergraduate, 5: Graduate)
Mhh	Number of household members
Employ	Dummy employment status of household head (1: Working; 0: Otherwise)
Selfemploy	Dummy type of work (1: self-employment; 0: otherwise)
Govwork	Dummy type of work (1: government worker; 0: otherwise)
Unpaid	Dummy type of work (1: work for the family without pay; 0: otherwise)
Casualagri	Dummy type of work (1: Casual agriculture worker; 0: otherwise)
Casualnonagri	Dummy type of work (1: Casual non-agriculture worker; 0: otherwise)
Urban	Dummy household residence (1: urban; 0: rural)
High_Asset	Dummy ownership of land or house assets (1: owns the asset; 0: otherwise)
Saving_Deposit	Dummy ownership of savings, deposit, or jewelry asset (1: owns the asset; 0: otherwise)
Spouse_Work	Dummy spouse employment (1: Employed; 0: otherwise)
Mobility_Access	Dummy ownership of access to mobility – transport equipment (1: have access; 0: otherwise)
Cominfo_Access	Dummy ownership of access to communications and information (1: have access; 0: otherwise)
Electric_Access	Dummy ownership of access to electricity (1: have access; 0: otherwise)
Finance_Access	Dummy ownership of access to a financial institution (1: have access; 0: otherwise)

Note: Research Data (IFLS)

Table 2 describes the independent variables employed for this study, covering demographics, socioeconomic status, geographic location, labor, assets ownership, and access to services (health, finance, electricity, mobility, and communications).

## Analysis technique

This study follows the chronic poverty method proposed by Duclos et al. (2010) that has been employed in earlier studies (Bayudan-Dacuycuy & Lim, 2013; Mai & Mahadevan, 2016). The estimation of the poverty gap and the components of poverty (EDE approach) are presented in this section.

A normalized poverty gap for wave  $t$  is represented as:

$$g_{it} = \frac{z_t - y_{it}}{z_t} \quad (\text{Equation 1})$$

Where is  $g_{it}^a = \left(\frac{z_t - y_{it}}{z_t}\right)^a$  if  $z_t > y_{it}$  and  $g_{it}^a = 0$  if  $z_t \leq y_{it}$

$z_t$  is defined as the poverty line in year  $t$  of a district or city where the household lives,  $g_{it}$  is the normalized gap across all waves for each household  $i$  (denoted by  $g_{i1}, g_{i2}, g_{i3}, \dots, g_{iT}$ ), and  $y$  is the average expenditure per household member. This study chooses household expenditure to measure the poverty gap. Following Glewwe and Twum-Baah (1991), measuring poverty in developing countries is more appropriate using the amount of household expenditure than the amount of income. This is due to consistency with economic theory for most developing countries, where expenditure is more directly correlated with family welfare. Employing a monotonic transformation of the poverty gap ( $\Gamma_\alpha$ ) turns to a measure of total poverty (expenditure-based) as

$$\Gamma_\alpha^{\text{Total}}(g) = \Gamma_\alpha(g) = [P_\alpha(g)]^{1/\alpha} \quad (\text{Equation 2})$$

$\Gamma_\alpha(g)$  is the EDE poverty gap. If the sign is the same for all individuals and over time, it will produce the exact poverty estimate and the same result from the distribution of the  $g$  poverty gap. The cost of increasing the average poverty gap can be described as  $C_\alpha(g)$ .

$$C_\alpha(g) = \Gamma_\alpha(g) - \Gamma_1(g) \quad (\text{Equation 3})$$

$C_\alpha(g)$  is used as the basis for breaking down total poverty into chronic poverty and transient poverty, which is obtained from the reduction between the EDE poverty gap  $\Gamma_\alpha(g)$  and the average poverty gap ( $\Gamma_1(g)$ ). Still, this value does not account for inequality in poverty status, and hence  $\alpha$  becomes  $\geq 1$ .

$$Y_\alpha(g_i) = \left(\frac{1}{T} \sum_{t=1}^T g_{it}^\alpha\right)^{1/\alpha} \quad (\text{Equation 4})$$

$$\Gamma_\alpha^{\text{Trans}}(g) = \frac{1}{n} \sum_{i=1}^n (Y_\alpha(g_i) - y_1(g_i)) \quad (\text{Equation 5})$$

$$\Gamma_\alpha^{\text{Total}}(g) = \Gamma_1(g) + C_\alpha(Y_\alpha) + \Gamma_\alpha^{\text{Trans}}(g) \quad (\text{Equation 6})$$

$\Gamma_{\alpha}^{Trans}(g)$  is the temporary aggregate cost of poverty at individual poverty status. Based on theory  $\Gamma_{\alpha}^{Total}(g)$  or total poverty can be obtained from the average poverty gap ( $\Gamma_1(g)$ ), the cost of inequality in the EDE poverty gap between individuals ( $C_{\alpha}(\gamma_{\alpha})$ ), and the aggregate cost of temporary poverty. From this theory, it can be inferred that chronic poverty is the difference between total poverty and temporary poverty, denoted as:

$$\Gamma_{\alpha} \text{ Kronic } (g) = \Gamma_1 (g) + C_{\alpha}(\gamma_{\alpha}) \quad (\text{Equation 7})$$

Finally, panel data containing short periods requires correction for the emerging bias, considering that the individual's average income computed may not come from the actual distribution (Duclos et al., 2010). Therefore, this study corrects the value of the average household expenditure in each period using a bootstrapping method.

After calculating poverty using the EDE method, we decomposed estimates according to different household characteristics to provide a profile of chronic poverty in Indonesia, obtained from the average value of each category. The poverty profile is described through three household characteristics, i.e., the economic, social, and demographic factors (See variables in Table 2). In addition, the estimates of chronic poverty are depicted in a map to illustrate how different poverty levels are across Indonesia (Figure 1).

In addition to analyzing the profile of chronic poverty in Indonesia, this study estimates the quantile regression. Following Bayudan-Dacuycuy and Lim (2013), the study analyzes determinants of chronic poverty across poor households. Our dependent variable will have the presence of zeros (periods of expenditure above the poverty line), which may cause censoring issues. To bypass this, we follow Jalan and Ravallion (2000), which found that values containing 0 (households that are not classified as poor on a period) can be treated by doubling the poverty line and recalculating poverty indicators. Grouping at a specific quantile limit can accurately capture the existing distribution (Bayudan-Dacuycuy & Lim, 2013). The quantile regression is more appropriate as it allows us to look at the 75<sup>th</sup> quantile, contrary to the Ordinary least Square (OLS), which estimates results around the mean. For comparison, quantile regression is carried out at 25%, 50%, 75%, and 100%. Employing quantile regressions allows obtaining a clearer picture of how household characteristics relate to chronic poverty. The quantile regression model is formulated as follows:

$$y_i^* = \beta_{\theta} x_i + \epsilon_{\theta}, \text{Quant}_{\theta}(y_i | x_i) = \beta_{\theta} x_i \quad (\text{Equation 8})$$

$y_i^*$  is the dependent variable (chronic poverty),  $x_i$  is the set of independent variables, including social, economic, and demographic variables. Table 2 describes the set of variables employed. We examine whether social, economic, and demographic variables related to the head of household can help to explain the higher risk of chronic poverty. The choice of variables is supported by earlier studies in cases like China (Jalan & Ravallion, 2000), Egypt (Haddad & Ahmed, 2003), and the Philippines (Bayudan-Dacuycuy & Lim, 2013).

$\epsilon_{\theta}$  is the residual at a certain quantile, and  $\text{Quant}_{\theta}(y_i | x_i) = \beta_{\theta} x_i$ , and  $\theta$  denotes the quantile of  $y$ . The estimation results of the quantile regression allow the analysis of values within the four different quantiles. The difference in the estimation results can lead to variations in the direction

and magnitude of the coefficients of each independent variable, offering more profound insights into policymaking.

The percentage in the quantile indicates the distribution limit of the data used. The larger the quantile, the wider the data distribution of the dependent variable. The 25% quantile means that the estimate is limited only to households belonging to the 25% lowest chronic poverty rate. The 50% quantile implies that the estimate is only for households belonging to the 50% lowest chronic poverty rate. The 75% quantile means that the estimate is only for households belonging to the 75% lowest chronic poverty rate. At the same time, the 100% quantile implies that the estimation is carried out as a whole for all households without a specific value limit.

The following is an empirical model used to examine possible determinants of chronic household-scale poverty in Indonesia:

$$\begin{aligned} \text{Chronic} = & \beta_0 + \beta_1 \text{Gender}_{it} + \beta_2 \text{Age}_{it} + \beta_3 \text{Edu}_{it} + \beta_4 \text{Mhh}_{it} + \beta_5 \text{Employ}_{it} + \beta_6 \text{SelfEmploy}_{it} + \\ & \beta_7 \text{Govwork}_{it} + \beta_8 \text{Unpaid}_{it} + \beta_9 \text{CasualAgri}_{it} + \beta_{10} \text{CasualNonAgri}_{it} + \beta_{11} \text{LandBuild}_{it} + \\ & \beta_{12} \text{SavingDeposit}_{it} + \beta_{13} \text{SpouseWork}_{it} + \beta_{14} \text{Urban}_{it} + \beta_{15} \text{MobilityAcc}_{it} + \beta_{16} \text{CominfoAcc}_{it} + \\ & \beta_{17} \text{ElectricAcc}_{it} + \beta_{18} \text{FinanceAcc}_{it} + \varepsilon_{it} \end{aligned} \quad (\text{Equation 9})$$

## Results and analysis

### Chronic household poverty in Indonesia

The estimates of poverty dynamics indicate that most poor households in Indonesia are chronic, i.e., 77% on a national scale (Table 3). When analyzed based on location (urban-rural), chronic poverty remains the most significant percentage, reaching 75% in urban areas and nearly 79% in rural areas. When household heads (HHs) are removed below or beyond productive age from the sample, chronic poverty remains the largest component, almost three times higher than temporary poverty. Our estimates of chronic poverty are close to previous studies using EDE in Indonesia, which found that chronic poverty at the national level was at 76% (Mai & Mahadevan, 2016) and 78% (Wardana & Sari, 2020). Nevertheless, the cost of inequality between our estimates (Table 3) and previous studies differs, mainly as we employ a poverty line based on city/district level rather than provincial level.

For example, compared to Mai and Mahadevan (2016), who found a cost of inequality of nearly 70%, we saw less than 30%. We argue that average poverty plays a higher role in chronic poverty than the cost of inequality (as commonly discussed). The cost of inequality in poverty indicates the redistributive gain obtained from canceling horizontal inequality between individuals without lowering the social welfare. The cost of inequality is important when there are wide inequalities in poverty levels since it is related to a higher social cost in reducing poverty (Hulme & Shepherd, 2003). However, Indonesian poverty is not extreme. Therefore, the focus is not on narrowing poles within poverty but increasing the overall capability of poor people to meet their basic needs. The constant poverty reduction in the country during the previous decades indicates that individuals are close to the poverty line rather than far below it.



At a disaggregated level by age and gender groups (Table 4), we found that men lead 82% of households in Indonesia, and 89% of HHs are in the productive age. Among low-income families led by men, more than 75% experience chronic poverty at the national, rural, and urban levels (Table 3). Compared to the overall observations, the total, chronic and transient poverty are generally lower for families led by men than by women (Table 4). Such differences suggest that households led by women or individuals above or below productive age are more exposed to chronic poverty, which should be prioritized in the poverty alleviation agenda.

**Table 3:** Overview of Chronic Household Poverty in Indonesia

	Total Obs.	Total Poverty Mean	Transient Poverty Mean %	Chronic Poverty Mean %	Cost of Inequality Mean %	Average Poverty Mean %
<b>Full Sample</b>						
National	25,558	0.0660	0.0150 23%	0.0511 77%	0.0150 29%	0.0361 71%
Urban	14,859	0.0555	0.0137 25%	0.0418 75%	0.0137 33%	0.0280 67%
Rural	10,699	0.0806	0.0167 21%	0.0640 79%	0.0167 26%	0.0473 74%
<b>Restriction Sample (Household Heads on Productive Age and Male Gender)</b>						
National	19,043	0.0525	0.0130 25%	0.0396 75%	0.0130 33%	0.0265 67%
Urban	11,103	0.0442	0.0122 28%	0.0320 73%	0.0122 38%	0.0199 62%
Rural	7,940	0.0642	0.0142 22%	0.0501 78%	0.0142 28%	0.0359 72%

Note: Research Data (IFLS)

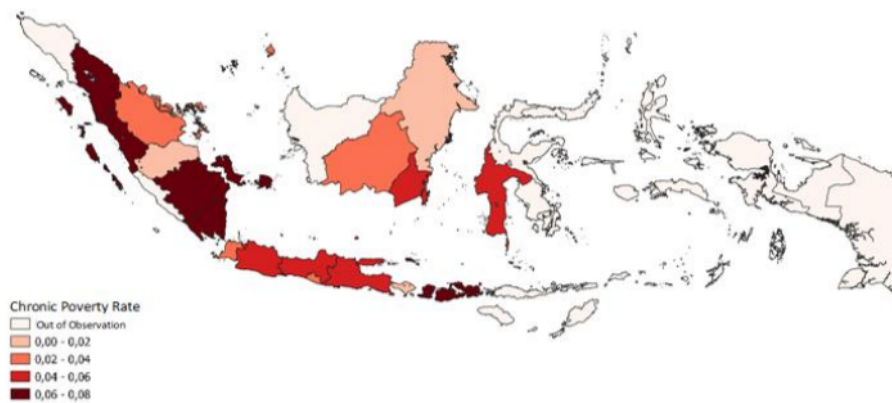
**Table 4:** Gender Composition and Age of Household Heads

	Variable	Obs	Proportion
Gender	Male	21,006	82%
	Female	4,548	18%
	<b>Total</b>	<b>25,554</b>	<b>100%</b>
Age	Productive Age (15–64 years old)	22,641	89%
	Not Productive Age (<15 or > 64 years old)	2,917	11%
	<b>Total</b>	<b>25,558</b>	<b>100%</b>

Note: Research Data (IFLS)

Figure 1 depicts provinces according to chronic poverty to provide a spatial perspective. The provinces with the highest rates of chronic poverty are North Sumatra, West Sumatra, South Sumatra, Lampung, Bangka Belitung and West Nusa Tenggara. Other provinces within Java Island also have high chronic poverty rates. Meanwhile, provinces with a moderate chronic poverty level are Riau Province, Riau Islands, Banten, Jakarta, Yogyakarta, and Central Kalimantan. Finally, the low level of chronic poverty is located in provinces like Jambi, Bali, and North Kalimantan.



**Figure 1:** Distribution of Chronic Poverty in Indonesia

Note: Research Data (IFLS), tabulated (2021)

Our findings support prior studies in Indonesia, which indicated that regions associated with natural resources experience lower welfare gains (higher chronic poverty) than those focusing on other economic activities (Santika et al., 2019). Sumatra and Kalimantan Islands (rich in natural resources) are associated with higher chronic poverty. By contrast, a sizeable proportion of chronic poverty found in East Indonesia is related to poor connectivity, lower economic activity, and lower human capital. Earlier studies in Indonesia have found gaps in poverty levels across provinces, cities, or regencies (Akita & Dariwardani, 2013; Bella & Dartanto, 2018).

**Table 5:** Descriptive Variable Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Chronic	25,558	0.0507256	0.1394966	0.0002	0.8527991
Age	25,558	44.12963	15.05428	17	96
Edu	16,253	2.70264	0.949949	1	5
Mhh	25,558	5.439158	3.057245	1	19

Note: Research data, tabulated (2020)

## Chronic poverty profile

Before presenting results at desegregated levels, we provided descriptive variables of age, education, and household size (Table 5). The average household head (HHs) age was nearly 44 years old. As for education, we considered five levels of education (see Table 2). Average education attainment was 2.7 (equivalent to junior-senior high school). The average household size (mhh) was 5.43 (members). Table 6 provides descriptive statistics of the additional social, economic and demographic characteristics. Regarding gender, as many as 82.2% of the homes in the sample were led by men, while women led the rest. Based on the employment status, 86.14% of HHs had a job. Based on the type of work of the HHs, 43% were self-employed, 6.77% were government workers (gov work), 1.59% were unpaid workers (unpaid), 3.52% were casual

agricultural workers (casualagri), and 7.91% were non-agricultural casual workers (casualnagri). Regarding the location of residences, 58.14% of families lived in urban areas. As for the status of asset ownership, 25% of households had assets in the form of land or buildings, and 61% of households had savings, deposits, or jewelry. Based on the status of household access to services, 64% of households had access to mobility, 92% had access to information and communication, 98% had access to electricity, and 96% had access to finance.

The summary results for the disaggregated analysis of chronic poverty in Indonesia are presented in Table 7. Households were grouped according to specific demographic, economic, and social characteristics. The results indicated that the older the age of the HH, the higher the rate of chronic poverty. Total poverty among HHs beyond 60 years old was 0.128, with 82% suffering chronic poverty. Meanwhile, the total poverty among young HHs (age group of 15-30 years) was 0.031 (four times lower than the elderly group), with average chronic poverty of 71%.

**Table 6:** Descriptive Statistics Variable Frequency (Dummy)

Variables	Dummy = 0		Dummy = 1		Total	
	N	%	N	%	N	%
Sex	4,548	17.8	21,006	82.2	25,554	100
Employ	3,541	13.86	22,013	86.14	25,554	100
Selfemploy	12,208	57.32	9,091	42.68	21,299	100
Govwork	19,856	93.23	1,443	6.77	21,299	100
Unpaid	20,961	98.41	338	1.59	21,299	100
Casualagri	20,550	96.48	749	3.52	21,299	100
Casualnonagri	19,610	92.07	1,689	7.93	21,299	100
Urban	10,699	41.86	14,859	58.14	25,558	100
High_Asset	18,989	74.52	6,494	25.48	25,483	100
Saving_Deposit	10,004	39.26	15,479	60.74	25,483	100
Spouse_Work	13,972	54.67	11,586	45.33	25,558	100
Mobility_Access	9,031	35.44	16,452	64.56	25,483	100
Cominfo_Access	2,128	8.35	23,355	91.65	25,483	100
Electric_Access	571	2.24	24,915	97.76	25,486	100
Finance_Access	957	3.74	24,601	96.26	25,558	100

*Note: Research data, tabulated (2020)*

According to gender, female HHs had average poverty of 0.097 (80% classified as chronic poverty). Meanwhile, male HHs had a total poverty of 0.058, with 77% chronically poor households. Previous studies also signaled that female-led families are considered chronically more deficient than those led by a man (Moeis et al., 2020; Taufiq & Dartanto, 2020). Our findings suggest that gender remains an issue. Both total poverty and chronic poverty indicators were more pronounced for females than males. Other studies also pointed out that females have less access to services and lower chances to participate in the labor market (Cameron et al., 2019) and are bound to social-cultural aspects that hinder their economic activities (Muryani & Esquivias, 2021). Therefore, improvements in human capital for women and equal access to opportunities are needed.

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The higher the educational level of the HH, the lower level of poverty and the lower the share of chronic poverty. For the lowest education group (elementary school or below), the extreme poverty was 0.132, and the average chronic poverty was 82%. Meanwhile, among those who graduated from junior high school, the total poverty fell to 0.052, with 75% chronic poverty. Among those with vocational or bachelor's degrees, the total poverty fell to nearly 0.022 (80% lower than those with primary education), with chronic poverty falling to 62%. Education level is critical in enabling people to escape total and chronic poverty, suggesting that educational reforms and the revitalization of vocational education proposed by the current government are crucial to improving welfare.

Although earlier studies in Indonesia identified the critical role of education in lowering poverty, earlier estimates for chronic poverty were substantially lower than ours (Akita & Dariwardani, 2013; Dartanto & Otsubo, 2016). As such, the role of education in chronic poverty may be understated in earlier studies. Despite using the same method and data source, the current study predicted a higher level of chronic poverty than Mai and Mahadevan (2016), most likely due to a) the up-to-date data quality and b) the disaggregation at the district level.

Besides, expected years of education have increased in Indonesia. For instance, from 2007 to 2014, it expanded from 11.6 years to 12.8, suggesting higher levels of education over time. Taufiq and Dartanto (2020) noted that education has a vital role in labor productivity as it promotes skills development. To some extent, the large share of casual workers and the self-employed (see Table 6) suggest that improvements in education may be especially relevant to help casual and informal workers develop the necessary skills to gain chances of employment.

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Households in larger sizes also reported higher total and chronic poverty levels, a finding in line with previous studies (Dartanto et al., 2020; Widyanti et al., 2009). Related to marital status, single households had lower total and chronic poverty rates, with women facing a nearly three-fold higher risk. Among families with no children, the average total poverty was 0.018, with 64% of them considered chronic poverty. As the number of children increases, the poverty level and the rate of chronic poverty increase. When a single parent leads a household, total poverty increases (compared to husband-wife families), with a male single parent having a lower average chronic poverty index (64%) than a female (76%).

Chronic poverty rates rise with the increase in dependency ratios. The dependency ratio (0–50%) had the smallest chronic poverty rate (77%). Average poverty and chronic poverty increased within the group with the highest dependency ratio (beyond 200%), average poverty and chronic poverty increased (80%). Changes influenced neither total poverty nor levels of chronic poverty in dependency ratio.

Based on the employment, households with both spouses had the lowest chronic poverty rate. Working spouses helped to reduce the average chronic poverty by 3%. Still, as suggested by Cameron et al. (2019), higher participation from women remains to be seen, and more opportunities need to be made available. Related to the type of work of the HHs, poverty among casual agricultural workers had the highest level of total poverty (0.11) and chronic poverty (82%). In contrast, government workers had the lowest (62%) chronic poverty. Poverty levels were also high among households with casual employment (79% are chronic poor) or unpaid work (79%).

**Table 7: Profile of Chronic Poverty in Indonesia Based on Demographic, Social and Economic Aspects**

Category	Obs	Total Poverty (a)	Chronic Poverty (b)	Percentage (b) to (a)
<b>Household head</b>				
<b>Age</b>				
15-30 years old	5,065	0.036092	0.025614	71%
31-40 years old	6,684	0.049074	0.036373	74%
41-50 years old	5,604	0.056728	0.043564	77%
51-60 years old	4,160	0.079038	0.061786	78%
>60 years old	4,039	0.128142	0.104567	82%
<b>Gender</b>				
Male	21,006	0.058677	0.044904	77%
Female	4,548	0.097283	0.077612	80%
<b>Education</b>				
Never - Primary School	2,040	0.132822	0.109052	82%
Junior high school or equivalent	4,155	0.052992	0.03995	75%
Senior high school or equivalent	6,849	0.039432	0.027697	70%
Vocational or bachelor's degree	3,016	0.022098	0.013599	62%
Magister / Doctoral	193	0.01905	0.010879	57%
<b>Household Size</b>				
Single	935	0.016158	0.010409	64%
Male	526	0.009642	0.005393	56%
Female	409	0.024538	0.01686	69%
Married couple	2,474	0.018836	0.012067	64%
With 1-2 children	5,522	0.028866	0.019955	69%
With 3-4 children	5,839	0.049851	0.036634	73%
With 5-6 children	3,272	0.0757	0.059303	78%
With > 6 children	3,101	0.139606	0.113569	81%
<b>Single Parents (Male)</b>				
With 1-2 children	725	0.032223	0.02064	64%
With 3-4 children	217	0.140387	0.114395	81%
With 5-6 children	205	0.137324	0.110415	80%
With > 6 children	258	0.155816	0.127263	82%
<b>Single Parents (Female)</b>				
With 1-2 children	1,002	0.050555	0.038342	76%
With 3-4 children	621	0.101775	0.081725	80%
With 5-6 children	558	0.154854	0.126722	82%
With > 6 children	825	0.193658	0.159031	82%
<b>Dependency Ratio</b>				
0-50%	11,564	0.063196	0.04857	77%
51-100%	5,904	0.067813	0.053049	78%



Category	Obs	Total Poverty (a)	Chronic Poverty (b)	Percentage (b) to (a)
101-200 %	1,580	0.074888	0.058539	78%
>200%	508	0.07285	0.058412	80%
<b>Employment Status</b>				
Employment	22,013	0.060502	0.046446	77%
Unemployment	3,541	0.096911	0.077329	80%
<b>Spouse's Employment Status</b>				
Employment	11,586	0.057027	0.0435	76%
Unemployment	13,972	0.072611	0.056718	78%
<b>Type of work</b>				
Self-Employment	9,091	0.073614	0.057917	79%
Government Worker	1,443	0.02185	0.013608	62%
Unpaid Worker	338	0.085158	0.067135	79%
Casual Agriculture Worker	749	0.111938	0.091342	82%
Casual Non-agriculture Worker	1,689	0.070062	0.054014	77%
<b>Asset ownership</b>				
Land or Building	6,494	0.050298	0.037187	74%
No (Land or Building)	18,989	0.070725	0.055335	78%
Saving or Deposit	15,479	0.04657	0.034631	74%
No (Saving or Deposit)	10,004	0.09484	0.07559	75%
<b>Residence</b>				
Urban	14,859	0.054879	0.041291	75%
Rural	10,699	0.080362	0.063829	79%
<b>Access</b>				
Mobility	16,452	0.047059	0.034791	74%
No (Mobility)	9,031	0.09915	0.079712	80%
Communication/Information	23,355	0.057452	0.04376	76%
No (Cominfo)	2,128	0.154061	0.126991	82%
Electricity	24,915	0.062769	0.048342	77%
No (Electricity)	571	0.18544	0.153904	83%
Finance	24,601	0.061585	0.047316	77%
No (Finance)	957	0.167384	0.138365	83%

Note: Research Data (IFLS); Mean EDE Poverty Gap. Percentage (b) to (a) provides the proportion of chronic poverty in total poverty.

The findings by Moeis et al. (2020) noted that, from 2000 to 2007, moving away from agriculture could lower the probability of chronic poverty by 13.5%. However, after 2014, labor mobility (away from agriculture) did not reduce poverty risk. Meanwhile, Taufiq and Dartanto (2020) emphasized that shifts from informal to formal labor can lower the risk of chronic poverty. That increasing levels of education will allow workers to move to formal jobs.

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In general, households without access to services had a higher level of poverty and a higher share of chronic poverty than households with access to services (nearly 6% lower). Access to electricity,



finance, communication, and information technology seemed to contribute the most in reducing average chronic poverty, in line with earlier findings stating that access to services supports higher income (Esquivias et al., 2020; Muryani et al., 2021).

## Quantile regression analysis

The quantile regression estimation following Bayudan-Dacuycuy and Lim (2013) corroborated the findings. The percentage in the quantile (25%, 50%, 75%, and 100%) indicates the distribution limit of the data employed based on the results of the Chronic Poverty EDE. As nearly 75–77% of poor households were chronically poor (based on our estimates), we placed special attention to the 75<sup>th</sup> quantile. The quantile regression analysis in this study was only intended to see the influence of household characteristics on chronicity. The value of chronic poverty used in the EDE method provided an aggregate measurement of chronic poverty, but not on the individual level (Mai & Mahadevan, 2016).

Table 8 shows the results of the quantile regression. In general, the coefficient on the quantile increases to higher quantiles. As nearly 75% of poor households were considered chronic, our main focus is on the Q75 (not the mean). The coefficient values for the lowest quintile (Q25) showed the weakest coefficients among the four groups. At higher quantiles, there was an increase in the explanatory power that justifies the variations at higher distributions.

The variable age of the HH had a positive and significant effect on the increase of the chronic poverty rate in all quantiles. This study is in line with Akita & Dariwardani (2013), who found similar links between the age of HH and chronic poverty, both for homes located in rural and urban areas.

The estimates for the gender variable suggested that male HHs faced a lower risk of chronic poverty than female HHs (in the Q75 distribution), which is in line with previous research (Haughton & Khandker, 2009; Ribas & Machado, 2007; Salehi-Isfahani & Majbouri, 2013; van Edig & Schwarze, 2011); as well as the findings of research specific to Indonesia (Bella & Dartanto, 2018; Muryani & Esquivias, 2021). However, for poor households (non-necessarily chronic, grouped outside the 75% highest quartile), other factors (besides gender) may explain the gender gap. Meanwhile, access to services (i.e., health, education), better labor opportunities for females (Taniguchi & Tuwo, 2014), and childcare responsibilities may also play a role, as noted in Schaner and Das (2016).

The HHs' education hurt the chronic poverty rate in all quantiles. The coefficient of education had more substantial effects at higher quantiles (highest for the 75<sup>th</sup> Q). This finding was in line with the research by Srinivas (2015) and De Silva and Sumarto (2015), which stated that education is a critical determinant of chronic poverty. Similarly, research specific to Indonesia also supported the findings (Dartanto & Nurkholis, 2013; Mai & Mahadevan, 2016). However, while improvements in education in the last decades might have reduced chronic poverty in Indonesia (mainly among the poorest and female), the impact of access to education on poverty reduction may decline over time as basic instruction is becoming more universally available in Indonesia. New efforts in quality education are needed rather than access to instruction alone.

**Table 8:** Chronic Poverty Quantile Regression Results in Indonesia

	Chronic			
	Q25	Q50	Q75	Q100
<i>Age</i>	0.000614*** (0.000178)	0.000938*** (0.000297)	0.00171*** (0.000540)	0.00140*** (0.000307)
<i>sex</i>	-0.00635 (0.00577)	-0.0122 (0.00848)	-0.0365* (0.0192)	-0.0141 (0.0105)
<i>Edu</i>	-0.00430* (0.00222)	-0.0143*** (0.00364)	-0.0347*** (0.00647)	-0.0235*** (0.00419)
<i>mhh</i>	0.00541*** (0.000768)	0.0148*** (0.00141)	0.0263*** (0.00202)	0.0197*** (0.00116)
<i>employ</i>	-0.0152 (0.00976)	-0.0495*** (0.0143)	-0.0594** (0.0296)	-0.0415*** (0.0139)
<i>c_selfemploy</i>	-0.00861* (0.00477)	-0.0114** (0.00537)	-0.0218* (0.0114)	-0.0215*** (0.00767)
<i>c_govwork</i>	-0.0165*** (0.00520)	-0.0239*** (0.00862)	-0.0354*** (0.00993)	-0.0474*** (0.00959)
<i>c_unpaid</i>	0.0100 (0.0178)	-0.00700 (0.0292)	0.0824 (0.0770)	0.0158 (0.0311)
<i>c_casualagri</i>	0.0152 (0.0129)	0.0474 (0.0475)	0.0690 (0.0589)	0.0471* (0.0250)
<i>c_casualnagri</i>	-0.00876 (0.00576)	-0.00894 (0.00876)	-0.0351** (0.0161)	-0.0133 (0.0125)
<i>urban</i>	-0.00317 (0.00400)	-0.00902* (0.00527)	-0.0197 (0.0138)	-0.0205*** (0.00752)
<i>high_asset</i>	-0.00363 (0.00475)	-0.0126** (0.00584)	-0.0190** (0.00913)	-0.0136* (0.00758)
<i>saving_deposit</i>	-0.00467 (0.00416)	-0.0104* (0.00550)	-0.0193* (0.0114)	-0.0239*** (0.00724)
<i>spouse_work</i>	-0.00608* (0.00333)	-0.0171*** (0.00514)	-0.0343*** (0.00954)	-0.0234*** (0.00660)
<i>mobility_access</i>	-0.0132*** (0.00467)	-0.0303*** (0.00638)	-0.0676*** (0.0146)	-0.0539*** (0.00791)
<i>cominfo_access</i>	-0.0312*** (0.0107)	-0.100*** (0.0269)	-0.180*** (0.0342)	-0.0932*** (0.0151)
<i>electric_access</i>	-0.0525* (0.0317)	-0.0996*** (0.0311)	-0.0830** (0.0353)	-0.0631*** (0.0236)
<i>finance_access</i>	-0.0394* (0.0206)	-0.105*** (0.0284)	-0.0876*** (0.0321)	-0.0530*** (0.0187)
<i>_cons</i>	0.167*** (0.0372)	0.433*** (0.0435)	0.625*** (0.0541)	0.390*** (0.0336)
<i>N</i>	<b>2,873</b>	<b>2,873</b>	<b>2,873</b>	<b>2,873</b>
<i>r2</i>	<b>0.105</b>	<b>0.145</b>	<b>0.282</b>	<b>0.311</b>
<i>q</i>	<b>0.250</b>	<b>0.500</b>	<b>0.750</b>	<b>1.000</b>
<i>q_v</i>	<b>0.0435</b>	<b>0.0953</b>	<b>0.276</b>	<b>0.801</b>

Note: Research Data (IFLS); standard errors in parentheses \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ; Bootstrap 200 replications

The impacts of education also differ across quantile groups (distributions) of households. Higher education may increase welfare for chronically poor households (75<sup>th</sup>), although it may not

substantially increase the welfare for transiently poor households. This is in line with previous research in Indonesia (Hanandita & Tampubolon, 2016; Muryani et al., 2021). Among other groups, people with disabilities are more vulnerable to exclusion and face more significant education gaps (Usman & Projo, 2021), requiring a particular focus on policy.

Regarding household size, it had a positive effect on the chronic poverty rate in all quantiles. A more considerable coefficient value for higher quantile groups indicated that household size had a greater influence on chronic poverty (highest around 75<sup>th</sup> quantile). This finding is in line with Houghton and Khandker (2009, pp. 147–151), Bayudan-Dacuycuy and Lim (2013), Geda et al. (2001), and research specific to Indonesia (Dartanto & Nurkholis, 2013; Muryani & Esquivias, 2021; Widyanti et al., 2009).

The employment status of HH had a significant and negative effect on the chronic poverty rate (highest at the 75<sup>th</sup> quantile). The HHs' employment reduces the risk of poverty, in line with Akita and Dariwardani (2013). As suggested in Schaner and Das (2016), the increasing labor participation from women in Indonesia in urban areas contributed to a decrease in poverty and a rise in wages. Similarly, Moeis et al. (2020) pointed out the need to focus on employment generation and upskill rural workers to move to non-agricultural sectors (Schaner & Das, 2016). People with special needs may require friendly policies to incorporate into the labor market and participate in entrepreneurial activities (Usman & Projo, 2021).

The findings suggested that household heads who were self-employed, work for the government, and were non-farm casual workers had significantly lower likelihood of chronic poverty, in line with previous findings (Akita & Dariwardani, 2013; Geda et al., 2001). Additionally, promoting formality in labor can help reduce poverty and raise income (Taufiq & Dartanto, 2020), with females likely being game-changers (Babbitt et al., 2015). This finding suggests that empowering self-employed workers and strengthening entrepreneur skills can positively impact poverty reduction.

Regarding location, households in urban areas had a lower likelihood of experiencing poverty (25<sup>th</sup> Q and 100<sup>th</sup> Q - likely referred to as transient poverty) than households in rural areas. However, the results were not significant for the 75<sup>th</sup> Q, suggesting that living in urban areas does not reduce chronic poverty. The findings differ with Dartanto and Nurkholis (2013) and Bayudan-Dacuycuy and Lim (2013), who noted that living in rural areas increased the likelihood of experiencing chronic poverty. A possible explanation is that rural poverty in the Philippines (Bayudan-Dacuycuy & Lim, 2013) differs from Indonesia. As for Dartanto and Nurkholis (2013), their estimates supported higher transient poverty rather than chronic, probably undervaluing chronic poverty. Still, we found that more labor opportunities in urban areas can help improve people's welfare, especially for females (Schaner & Das, 2016; Taniguchi & Tuwo, 2014), although income gaps remain wide. Besides, better access to higher quality services (e.g., education, health, information) and infrastructure in urban areas support higher living standards (Dartanto & Otsubo, 2016).

Based on household asset ownership, the results indicated that owning assets in the form of land or buildings and ownership of financial support or jewelry had a significant and negative effect on chronic poverty, in line with previous findings (Dartanto et al., 2020; Dartanto & Otsubo, 2016), and research on income level in Indonesia (Esquivias et al., 2020). Better access to finance can



increase income levels by facilitating households in business activities, access services, and improving labor opportunities (Esquivias et al., 2021).

Finally, access to finance and public facilities reduced the likelihood of chronic household poverty. Similarly, access to markets (communications – transportation), health services, electricity, and sanitation played a role in reducing chronic poverty. Similarly, Esquivias et al. (2020) found that access to services (finance, information, mobility) in Indonesia can help increase individuals' income in East Indonesia.

Barrientos et al. (2005) and Lipton and Ravallion (1995) emphasized that chronic and transient poverty required different policy responses. Chronic poverty requires policies that address structural factors to improve human and physical capital (education, health services, skills, infrastructure, housing, among others), as suggested by Hanandita and Tampubolon (2016) and Mai and Mahadevan (2016). Similarly, we recommend that the impact of social, economic, and demographic variables differ across the poor by using the quantile approach, warranting more diverse strategies. While liberating those who are closer to the poverty line through social programs is probable, it may not be easy to free those who are farther away from the borders of poverty, i.e., with less human capital, live in rural areas, lack access to services, or work in agriculture.

Our findings suggested that households experiencing chronic poverty were more likely to remain poor and excluded from labor opportunities and access to services, in line with Adji and Rachmad (2017). Finally, it is important to note that there are large gaps in Indonesia's social, economic, and demographic aspects, which means more issues threaten the welfare, such as income inequality (Muryani et al., 2021), the disparity in access to services, and gaps in quality of access human resources capital programs.

## Conclusion and policy implication

<sup>2</sup> This study estimates poverty in Indonesia by employing the equally distributed equivalent (EDE) approach covering 2007 and 2014. The results indicate that chronic poverty constitutes the most significant proportion of poverty dynamics in Indonesia, estimated at 77% at the national level. At a disaggregated level, based on location (province), urban-rural, education, gender, and employment, the proportion of chronic poverty remains the largest, contrary to what several studies in Indonesia have suggested. Besides, we found lower costs of inequality due to employing more disaggregated poverty lines. Households' characteristics—age, gender, and education level—have a higher average score of total poverty and chronic poverty. Households of a larger size and with a higher dependency ratio face a higher risk of chronic poverty as well.

We apply quantile regression to test whether social, economic, and demographic aspects can explain the likelihood of households to experience chronic poverty. The results indicate that factors like age (older), gender (female), low education, large household size, and high dependency ratio increase chronic poverty likelihood. Employment status, including spouse employment, working for the government, or self-employment, increases the probability of escaping chronic poverty. By contrast, casual and unpaid jobs may lead to a higher likelihood of

poverty (overall), particularly in the agricultural sector. However, we do not find evidence that casual workers in agriculture or households in rural areas are more prompt to chronic poverty (specifically). Ownership of assets in the form of land, buildings, or financial assets lowers chronic poverty risk. Access to services (finance, mobility, communication, and health) also reduces the risk of chronic poverty.

The dominant proportion of chronic poverty implies the focus of poverty reduction policies should be towards increasing human resources and physical assets. Chronic poverty reduction can be prioritized in households headed by women, single parents with children (more than two), unemployed HHs; those with low education; or those who do not have land or building assets. Similarly, improving access to services (finance, health, electricity, transportation, and communication) can help to decrease the share of chronic poverty, as well as promote and empower households to entrepreneurship (self-employment).

Government policies that aim to improve the quality of human capital in education and facilitate ownership of assets, prioritizing female household heads and those who live in rural areas, are necessary to accelerate poverty reduction in Indonesia. Finally, it is worth noting that the significant gaps found in the different social, economic, and demographic aspects indicate other potential welfare issues, for instance, income inequality. As some groups of individuals are more educated, have better access to services, or are endowed with more assets, they may find it easier to improve their livelihood. While this study mainly relies on variables related to status and access, it did not consider the quality of certain aspects. Marginal effects may be more prominent when accounting for quality-related issues. This could be an empirical gap for further studies.

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