

# Determinants of Poverty in Malawi using the Fifth Integrated Household Survey



Steven Henry Dunga <sup>1</sup>  & Redson Mwandama <sup>2</sup> 

<sup>1</sup> School of Economic Sciences, North-West University, Vanderbijlpark, South Africa.

<sup>2</sup> Department of Economics, University of Malawi, Zomba, Malawi.

## ABSTRACT

This study examined the factors influencing poverty in Malawi, using the Fifth Integrated Household Survey (IHS5). Using a binary logistic regression model, the analysis identified key socioeconomic determinants of poverty status, such as employment type, education level, household size, dependency ratio, and geographical location. The findings revealed that households in informal employment, larger households and higher dependency ratios are more likely to experience poverty. In contrast, higher educational attainment and urban residency reduce the risk of poverty. The study highlights the ongoing rural-urban divide and emphasises the transformative impact of education and access to formal employment on the reduction of poverty.

### Correspondence

Steven Henry Dunga

Email:

[Steve.dunga@nwu.ac.za](mailto:Steve.dunga@nwu.ac.za)

### Publication History

Received:

24<sup>th</sup> April, 2025

Accepted:

19<sup>th</sup> June, 2025

Published:

11<sup>th</sup> July, 2025

**Keywords:** *Poverty, Access to Credit, Rural-Urban Divide, Dependency Ratio, Employment Status*

## INTRODUCTION

The conceptualisation of poverty should have reached consensus by now given how long it has been in discussion, from as early as 1759 when Adam Smith pointed out that misery and disorder in human life seem to arise from the difference between poverty and riches with the publication of Seeböhm Rowntree's study of York, or even earlier than that.<sup>1</sup> Centuries of studying poverty have not resolved the definitions or the measures. There is still enough agreement in the basic definitions of what abject poverty is characterised by a lack of essential needs such as shelter, food, healthcare, water, and safety.<sup>2</sup> Although the prevalence and severity of poverty differ by location and measurement, it is a persistent global issue that affects billions of people on all continents. In Europe, the primary challenges are social exclusion and income inequality, with poverty often being relative. Southern and Eastern European countries, such as Greece, Romania, and Bulgaria, face the highest poverty rates due to economic stagnation, unemployment, and inadequate social assistance systems.<sup>3</sup> Despite being one of the richest continents, Europe struggles with wealth inequality, particularly in disadvantaged areas where opportunities are limited.<sup>4</sup>

In many developing countries in Asia, poverty remains a significant concern despite considerable economic growth in recent decades. South Asia, in particular, has some of the world's

<sup>1</sup> Adam Smith, *The Theory of Moral Sentiments* (Dover Publications, 1959); Benjamin Seeböhm, *Poverty: A Study of Town Life* (New York: Macmillan And Co. Limited, 1909).

<sup>2</sup> P. Mdluli and S. Dunga, "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data," *Journal of Poverty* 26, no. 3 (April 16, 2022): 197–213, <https://doi.org/10.1080/10875549.2021.1910100>.

<sup>3</sup> John Creamer et al., "Poverty in the United States: 2021," *US Census Bureau*, 2022.

<sup>4</sup> World Bank, "Poverty and Shared Prosperity 2020: Reversals of Fortune" (The World Bank, 2020); F. H. G. Ferreira and M. Ravallion, "Global Poverty and Inequality: A Review of the Evidence," *World Bank Policy Research Working Paper*, 4623, 2008.

highest poverty rates, with rural poverty persisting in Bangladesh, Nepal, and India due to factors like low educational attainment, rapid population growth, and reliance on subsistence farming.<sup>5</sup> Although industrialisation and urbanisation have significantly reduced poverty in Southeast Asia, there remain disparities between rural and urban populations. In East Asia, China has successfully lifted hundreds of millions from extreme poverty; however, isolated and ethnically diverse regions still experience significant poverty due to slower economic growth.<sup>6</sup>

The patterns of poverty in the Americas vary, with Latin American countries facing more severe and widespread absolute poverty, while industrialised nations such as the United States primarily contend with relative poverty. In the U.S., racial disparities and systemic inequality disproportionately affect minority groups, including African Americans and Hispanics.<sup>7</sup> Political instability, dependence on commodity exports, and structural inequality further exacerbate poverty in Latin America. Countries like Haiti and Venezuela exemplify some of the region's worst poverty rates, worsened by governance challenges and economic crises.<sup>8</sup> In contrast, nations like Chile and Uruguay have dramatically reduced poverty through sustained economic growth and targeted social initiatives.<sup>9</sup>

Sub-Saharan Africa remains the centre of global poverty, with approximately 40% of the population living on less than \$1.90 per day.<sup>10</sup> High fertility rates, inadequate infrastructure, and reliance on rain-fed agriculture leave residents vulnerable to climate shocks. The highest poverty rates in the world are found in countries such as South Sudan, the Central African Republic, and Malawi, where political unrest, conflict, and lack of access to essential services exacerbate the situation.<sup>11</sup> Rural communities are disproportionately affected due to limited access to clean water, healthcare, and education.<sup>12</sup> Efforts to alleviate poverty in Sub-Saharan Africa are further hampered by climate change and rapid population growth, which present significant challenges to sustainable development.

Malawi, like many sub-Saharan African countries, is persistently ranked among the poorest nations globally. According to the Multidimensional Poverty Index (MPI) developed by the United Nations Development Programme and the Oxford Poverty and Human Development Initiative, Malawi consistently ranks among the top 20 poorest countries.<sup>13</sup> Despite some progress, the incidence of poverty decreased from 70.4% in 2017 to 62.1% in 2019; however, systemic deprivation persists in critical areas such as health, education, and access to services.<sup>14</sup>

Malawi's poverty reduction strategies are aligned with global and local frameworks, such as the Sustainable Development Goal (SDG) 1, which aims to eradicate income and multidimensional poverty by 2030, and the Malawi 2063 Agenda, which focuses on wealth creation and inclusivity.<sup>15</sup> However, persistent structural barriers, including low educational attainment, limited economic opportunities, and environmental shocks, impede progress. The rural-urban divide further exacerbates these challenges; rural households experience significantly higher poverty rates and greater deprivation than their urban counterparts.<sup>16</sup>

This study aims to identify and analyse the key determinants of poverty in Malawi using data

<sup>5</sup> World Bank, "Poverty and Shared Prosperity 2020: Reversals of Fortune."

<sup>6</sup> Chenhong Peng et al., "Determinants of Poverty and Their Variation across the Poverty Spectrum: Evidence from Hong Kong, a High-Income Society with a High Poverty Level," *Social Indicators Research* 144 (2019): 219–50.

<sup>7</sup> Creamer et al., "Poverty in the United States: 2021."

<sup>8</sup> Helen Canton, "Economic Commission for Latin America and the Caribbean—ECLAC," in *The Europa Directory of International Organizations 2021* (Routledge, 2021), 142–44.

<sup>9</sup> Richard J. Cebula and Malissa L. Davis, "Determinants of Poverty in the US State of Virginia: An Examination of the Impact of Rent (the Neglected Variable)," *Regional Studies, Regional Science* 9, no. 1 (December 31, 2022): 818–30, <https://doi.org/10.1080/21681376.2022.2151933>.

<sup>10</sup> World Bank, "Poverty and Shared Prosperity 2020: Reversals of Fortune."

<sup>11</sup> Mduduzi Biyase and Talent Zwane, "An Empirical Analysis of the Determinants of Poverty and Household Welfare in South Africa," *The Journal of Developing Areas* 52, no. 1 (2018): 115–30; P. Collier, *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done about It* (Oxford: Oxford University Press, 2008); Ismael Maloma and Hannah Dunga, "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic," *International Journal of Research in Business and Social Science* (2147-4478) 12, no. 4 (June 2023): 400–409, <https://doi.org/10.20525/ijrbs.v12i4.2438>.

<sup>12</sup> National Statistical Office, *Malawi Poverty Report 2020* (Government of Malawi, 2021), [www.nsomalawi.mw](http://www.nsomalawi.mw).

<sup>13</sup> Chispine Adams Mtocha, Gowokani Chijere Chirwa, and Jacob Mazalale, "Multidimensional Poverty Changes in Malawi," in *The Palgrave Handbook of Global Social Problems* (Springer, 2024), 1–31.

<sup>14</sup> Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

<sup>15</sup> National Statistical Office, *Malawi Poverty Report 2020*, 5.

<sup>16</sup> Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

from the Fifth Integrated Household Survey (IHS5), conducted between 2019 and 2020. Despite ongoing policy interventions and development programs, poverty remains a significant challenge, impacting a large portion of the population. This research seeks to uncover the socioeconomic, demographic, and geographic factors that influence household poverty levels. Understanding these determinants is essential to inform evidence-based policymaking and design targeted interventions that can effectively reduce poverty and improve livelihoods. The study intends to provide policymakers, development partners, and researchers with valuable insights into the characteristics and conditions that increase the likelihood of households experiencing poverty, thereby contributing to the broader goals of sustainable development and poverty eradication in Malawi.

## LITERATURE REVIEW

### *Globe perspective of determinants of poverty*

Poverty continues to be one of the most pressing global challenges, with its determinants differing across regions, economies, and social contexts. A thorough understanding of the multifaceted nature of poverty is essential for designing effective interventions. This review synthesises the findings of recent studies conducted in different countries, highlighting the socioeconomic, demographic, and policy-related factors that influence poverty.

Indonesia has been a focal point for poverty research due to its diverse socioeconomic landscape. Dewi and Nursiyono explored the impact of poverty determinants during the COVID-19 pandemic in East Java.<sup>17</sup> They identified unemployment, population density, the Human Development Index (HDI), and cumulative COVID-19 cases as significant contributors to increasing poverty levels. Their application of multiple linear regression analysis highlighted the need for targeted interventions during crises.

In a similar vein, Prasada *et al.*, examined poverty on Java Island using panel data and the Ordinary Least Squares (OLS) model.<sup>18</sup> Their findings indicated strong correlations between poverty and unemployment, inflation, and HDI, underscoring the interconnectedness of economic and social factors. In West Java, Fiskal and Wardani utilised a fixed-effects model to analyse data from 2015 to 2018, finding that HDI, population growth, and Gross Regional Domestic Product (GRDP) significantly contributed to reducing poverty.<sup>19</sup> Collectively, these studies emphasise the importance of human development and economic growth in poverty alleviation.

Kurniasari and Oktavilia expanded this analysis to both Western and Eastern Indonesia, applying panel data regression from 2010 to 2021.<sup>20</sup> Their findings showed regional disparities, revealing that Eastern Indonesia faced higher levels of poverty. Factors such as life expectancy, education, and investment negatively affected poverty, while GRDP and social protection spending showed mixed effects. This study highlights the need for region-specific policies to effectively address poverty.

Ali and Ali investigated the determinants of poverty in Pakistan using time series data from 1995 to 2013.<sup>21</sup> Their OLS analysis indicated that government expenditure and budget deficits had a negative impact on poverty, while unemployment and inflation worsened the situation. Additionally, the study pointed out the influence of exchange rates, suggesting that currency depreciation could potentially reduce poverty. These findings imply that implementing fiscal policies aimed at increasing government spending and reducing deficits is crucial for alleviating poverty.

Peng *et al.*, examined poverty in Hong Kong, a high-income society marked by severe economic disparities.<sup>22</sup> Using logistic and quantile regression analyses, they found that elderly individuals, females,

<sup>17</sup> Ima Sartika Dewi and Joko Ade Nursiyono, "Determinants of Poverty in East Java During The COVID-19 Pandemic," *EkBis: Jurnal Ekonomi Dan Bisnis* 7, no. 1 (June 17, 2023): 1–11, <https://doi.org/10.14421/EkBis.2023.7.1.1603>.

<sup>18</sup> Imade Yoga Prasada, Tri Fatma Mala Yulhar, and Tia Alfina Rosa, "Determinants of Poverty Rate in Java Island: Poverty Alleviation Policy," *Jurnal Ekonomi Pembangunan* 18, no. 2 (2020): 95–104.

<sup>19</sup> M. Yusril Fiskal and Dyah Titis Kusuma Wardani, "Determinants of Poverty in West Java Province After the Regional Expansion of Pangandaran District," *Journal of Economics Research and Social Sciences* 4, no. 1 (2020), <https://doi.org/10.18196/jerss.040120>.

<sup>20</sup> Andini Kurniasari and Shanty Oktavilia, "Determinants of Poverty in Western Indonesia and Eastern Indonesia," *Economics Development Analysis Journal* 12, no. 1 (2023): 84–99.

<sup>21</sup> Asghar Ali and Sajjad Ali, "Determinants of Poverty in Pakistan," *Pakistan Journal of Humanities and Social Sciences Research* 1, no. 2 (2018): 17–31.

<sup>22</sup> Peng *et al.*, "Determinants of Poverty and Their Variation across the Poverty Spectrum: Evidence from Hong Kong, a High-Income Society with a High Poverty Level."

single-parent households, and those with lower education levels are particularly vulnerable to poverty. While informational support served as a protective factor, financial burdens and disabilities exacerbated the situation. The study underscored the disproportionate impact of aging on the deeply impoverished and highlighted the varied effects of public rental housing across different poverty levels.

Islam *et al.*, analysed poverty determinants in Bangladesh using data from the 2010 Household Income and Expenditure Survey (HIES).<sup>23</sup> Their probit model revealed that location, household size, and education significantly influenced poverty levels. The findings indicated that remittances decreased the risks of poverty, while households with disabled members faced a higher probability of poverty. They also noted regional disparities, with households in Dhaka, Khulna, and Rajshahi being more vulnerable compared to those in Barisal, Chittagong, and Sylhet.

Garza-Rodriguez *et al.*, analysed the determinants of poverty in Mexico based on data from the 2018 National Household Income and Expenditure Survey (ENIGH).<sup>24</sup> Their probit and quantile regression models identified female-headed households, speakers of indigenous languages, and larger household sizes as more likely to experience poverty. Conversely, higher education levels and non-primary sector employment were found to be protective factors. The study emphasised how the effects of poverty determinants varied across income levels, particularly for households in extreme poverty. Rios Avila introduced innovative Stata commands for analysing poverty and inequality using Recentered Influence Functions (RIFs).<sup>25</sup> By applying these methods to data from the U.S. Current Population Survey, the study demonstrated how demographic and socioeconomic factors influence distributional outcomes. This work equips researchers with accessible tools to perform nuanced poverty analyses and inform targeted policy interventions.

### **Poverty Determinants in Africa**

Geda *et al.*, conducted a seminal study on poverty determinants in Kenya, using household survey data from 1994.<sup>26</sup> Their binomial and polychotomous logit models revealed strong correlations between educational attainment, family size, and reliance on farming activities with poverty levels. The study emphasised the importance of education and income diversification in reducing poverty.

Some scholars also analysed the poverty determinants in South Africa, using data from the 2021 STATS SA and 2018 General Household Survey respectively.<sup>27</sup> Both studies highlighted the disproportionate vulnerability of female-headed and low-income households to poverty. They identified education, particularly for girls, as a key intervention to break intergenerational cycles of poverty. These findings underscore the need for gender-sensitive and inclusive policies.

Eyasu examined rural poverty in Ethiopia's Bahir Dar Zuria district through the Foster-Greer-Thorbecke (FGT) index and quantile regression analysis.<sup>28</sup> The study found that larger family size and poor health increased poverty, while land ownership, proximity to markets, and non-farm income served to reduce it. The quantile regression analysis revealed heterogeneous effects across expenditure quantiles, emphasising the necessity for tailored interventions to effectively address rural poverty.

Mukherjee and Benson analysed poverty in Malawi using data from the 1997–98 IHS.<sup>29</sup> Their multivariate regression model highlighted the positive impact of education, particularly for women, and non-agricultural employment on household welfare. Access to infrastructure and public works programs, such as the Malawi Social Action Fund (MASAF), also emerged as critical factors. However, the absence of updated research since this study highlights the need for contemporary analyses to tackle Malawi's

<sup>23</sup> Deen Islam, Jamil Sayeed, and Nazmul Hossain, "On Determinants of Poverty and Inequality in Bangladesh," *Journal of Poverty* 21, no. 4 (2017): 352–71.

<sup>24</sup> Jorge Garza-Rodriguez et al., "Determinants of Poverty in Mexico: A Quantile Regression Analysis," *Economies* 9, no. 2 (2021): 60.

<sup>25</sup> Fernando Rios Avila, "Recentered Influence Functions in Stata: Methods for Analyzing the Determinants of Poverty and Inequality," *Levy Economics Institute, Working Paper 927* (2019).

<sup>26</sup> Alemayehu Geda et al., "Determinants of Poverty in Kenya: A Household Level Analysis," *ISS Working Paper Series/General Series* 347 (2001): 1–20.

<sup>27</sup> Maloma and Dunga, "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic"; Mdluli and Dunga, "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data."

<sup>28</sup> Anteneh Mulugeta Eyasu, "Determinants of Poverty in Rural Households: Evidence from North-Western Ethiopia," *Cogent Food & Agriculture* 6, no. 1 (January 1, 2020): 1823652, <https://doi.org/10.1080/23311932.2020.1823652>.

<sup>29</sup> Sanjukta Mukherjee and Todd Benson, "The Determinants of Poverty in Malawi, 1998," *World Development* 31, no. 2 (February 2003): 339–58, [https://doi.org/10.1016/S0305-750X\(02\)00191-2](https://doi.org/10.1016/S0305-750X(02)00191-2).

evolving poverty dynamics.

The literature across the globe reviewed the multidimensional nature of poverty, with determinants that range from economic factors like unemployment and inflation to social factors such as education, gender, and household characteristics. Regional disparities further complicate the poverty landscape, necessitating context-specific interventions. Common themes in all studies include the critical role of education, the importance of economic diversification, and the need for gender-sensitive policies. Scholars are always trying to figure out and discuss the most crucial factors that contribute to poverty. Although these studies have improved our understanding of the dynamics of poverty, there is still a large body of current research on Malawi that is lacking. No thorough analysis of current data, such as the 2020 Integrated Household Survey (IHS5), has been carried out since the 2003 work by Mukherjee and Benson. This emphasises how crucial it is to review Malawi's poverty drivers because, during the past 20 years, there have been new possibilities and problems.

## METHODOLOGY

Poverty measurement has often relied on consumption as an indicator of household welfare, as it often provides a more stable and accurate reflection of living standards compared to income. This is particularly true in countries such as Malawi, where income is uneven and many households derive their livelihood from subsistence agriculture or informal activities. The National Statistical Office (NSO) used socioeconomic data from the IHS5, which was conducted between April 2019 and April 2020, to create the 2020 Malawi Poverty Estimates.

Estimating the number of people living in poverty in Malawi was done in two steps. The first was to calculate per capita consumption, which ranks everyone in the population from the least to the most consuming. In the second step, a suitable poverty threshold, or poverty line, was created and compared to per capita consumption to determine if a person is impoverished or not. The cost of a reference level of welfare to an individual at a specific location and time is known as the poverty line.<sup>30</sup> Food and non-food are the two components that make up Malawi's overall poverty line. The cost of a food package that meets each person's daily energy needs is represented by the food poverty line, and the non-food poverty line represents the cost of essential non-food necessities. The term "poor" is then applied to people who live in households with consumption below the poverty level. The "ultra-poor" are defined as households whose per capita consumption of food and non-food items is less than the minimum food consumption, using the minimum food consumption as an extra metric.

### *Model Specification*

In various studies analysing the determinants of poverty, researchers have employed statistical models tailored to their specific contexts and datasets. For example, Dewi and Nursiyono, used multiple linear regression to analyse the factors contributing to poverty during COVID-19 in East Java.<sup>31</sup> Likewise, some scholars applied Ordinary Least Squares (OLS) to examine poverty in Java Island and Pakistan, respectively.<sup>32</sup> In Indonesia, the fixed-effects models were utilised for panel data analysis, focusing on regional poverty dynamics.<sup>33</sup>

In Kenya, Geda *et al.*, employed binomial and polychotomous logit models to study household poverty.<sup>34</sup> Similarly, Maloma and Dunga used binary logistic regression to analyse poverty in South Africa.<sup>35</sup> In Malawi, Mukherjee and Benson applied a multivariate regression model, while Eyasu and Peng *et al.*, employed quantile regression to assess poverty in Hong Kong and Ethiopia, respectively.<sup>36</sup> Additionally, others utilised probit models to explore poverty in Mexico and

<sup>30</sup> Julio Boltvinik, *Poverty Measurement Methods: An Overview* (UNDP Social Development & Poverty Elimination Division. k, 1999).

<sup>31</sup> Dewi and Nursiyono, "Determinants of Poverty in East Java During The COVID-19 Pandemic."

<sup>32</sup> Prasada, Yulhar, and Rosa, "Determinants of Poverty Rate in Java Island: Poverty Alleviation Policy"; Ali and Ali, "Determinants of Poverty in Pakistan."

<sup>33</sup> Fiskal and Wardani, "Determinants of Poverty in West Java Province After the Regional Expansion of Pangandaran District"; Kurniasari and Oktavilia, "Determinants of Poverty in Western Indonesia and Eastern Indonesia."

<sup>34</sup> Geda *et al.*, "Determinants of Poverty in Kenya: A Household Level Analysis."

<sup>35</sup> Maloma and Dunga, "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic."

<sup>36</sup> Mukherjee and Benson, "The Determinants of Poverty in Malawi, 1998"; Eyasu, "Determinants of Poverty in Rural Households: Evidence from North-Western Ethiopia"; Peng *et al.*, "Determinants of Poverty and Their Variation across the Poverty Spectrum: Evidence from Hong Kong, a High-Income Society with a High Poverty Level."

Bangladesh.<sup>37</sup> Lastly, Avila introduced Recentered Influence Functions (RIFs) to analyse inequality and poverty in the U.S.<sup>38</sup>

### **Model for this study**

This study adopted the logistic regression model to analyse poverty status due to the binary nature of the dependent variable, which classifies households as either poor or non-poor. Logistic regression is particularly suited for this type of analysis because it estimates the probability of a binary outcome using a logistic function, ensuring that predicted probabilities fall within the 0–1 range.<sup>39</sup> Moreover, logistic regression accommodates various explanatory variables, including continuous, categorical, and interaction terms, making it a robust tool for modelling poverty determinants.<sup>40</sup>

### **Formulation of the Logistic (Logit) Model**

The logistic regression model expresses the probability that a household is poor as a function of explanatory variables. The probability that a household is poor, given a set of predictors, is modelled as:

$$P(Y = 1|X) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}} \quad (1)$$

Where: -  $P(Y = 1|X)$  is the probability that the dependent variable  $Y$  equals 1 given predictor variable  $X$ . -  $\beta_0$  is the intercept. -  $\beta_1, \beta_2, \dots, \beta_k$  are the coefficients for the predictor variables  $X_1, X_2, X_k$ . -  $e$  is the base of the natural logarithm.

This logistic function ensures that the predicted probabilities are bounded between 0 and 1, addressing the key limitation of linear probability models<sup>41</sup>. To linearise the relationship, the logit transformation is applied:

$$\ln\left(\frac{P(Y = 1|X)}{1 - P(Y = 1|X)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \quad (2)$$

This transformation converts the dependent variable into the log odds of being poor, allowing the estimation of coefficients using Maximum Likelihood Estimation (MLE)<sup>42</sup>

### **Estimation Procedure**

The coefficients in the logistic regression model are estimated using Maximum Likelihood Estimation (MLE). The likelihood function for households is expressed as:

$$L(\beta) = \prod_{i=1}^n [P(X_i)]^{Y_i} [1 - P(X_i)]^{1 - Y_i} \quad (3)$$

Taking the natural logarithm gives the log-likelihood function:

$$\ln(\beta) = \sum_{i=1}^n [Y_i \ln(P(X_i)) + (1 - Y_i) \ln(1 - P(X_i))] \quad (4)$$

The MLE approach identifies the set of coefficients that maximises this log-likelihood function. MLE is preferred because it provides asymptotically unbiased, efficient, and consistent parameter estimates.<sup>43</sup>

### **Strengths of the Logistic Regression Model in Poverty Estimation**

Logistic regression offers several advantages when estimating poverty. First, it provides probability estimates that are bounded between 0 and 1, ensuring meaningful interpretations<sup>44</sup>. Second, it allows

<sup>37</sup> Garza-Rodriguez et al., “Determinants of Poverty in Mexico: A Quantile Regression Analysis”; Islam, Sayeed, and Hossain, “On Determinants of Poverty and Inequality in Bangladesh.”

<sup>38</sup> Rios Avila, “Recentered Influence Functions in Stata: Methods for Analyzing the Determinants of Poverty and Inequality.”

<sup>39</sup> Damodar N Gujarati, “Basic Econometrics 4th Ed.,” 2002; Jeffrey M Wooldridge, *Econometric Analysis of Cross Section and Panel Data* (MIT press, 2010).

<sup>40</sup> David W Hosmer Jr, Stanley Lemeshow, and Rodney X Sturdivant, *Applied Logistic Regression* (John Wiley & Sons, 2013).

<sup>41</sup> Gujarati, “Basic Econometrics 4th Ed.”

<sup>42</sup> Hosmer Jr, Lemeshow, and Sturdivant, *Applied Logistic Regression*.

<sup>43</sup> Wooldridge, *Econometric Analysis of Cross Section and Panel Data*.

<sup>44</sup> Gujarati, “Basic Econometrics 4th Ed.”

flexible model specification, accommodating both continuous and categorical predictors, as well as interaction terms.<sup>45</sup>

Furthermore, the model effectively captures non-linear relationships between the dependent variable and predictors through the logit transformation, without requiring complex modifications. Logistic regression also has a robust estimation framework through MLE, which yields efficient and consistent estimates, particularly in large samples.<sup>46</sup>

**Weaknesses of the Logistic Regression Model and Potential Solutions**

Despite its strengths, logistic regression has several limitations in estimating poverty. One major challenge is the assumption of linearity in the log-odds, which may not always hold. Another issue is multicollinearity, where highly correlated predictors inflate standard errors and reduce the reliability of coefficient estimates. This problem can be mitigated by conducting a Variance Inflation Factor (VIF) analysis and removing or combining highly correlated variables.<sup>47</sup> Additionally, logistic regression may struggle with rare event bias, where infrequent poverty events lead to biased probability estimates. In such cases, Firth’s penalised logistic regression offers a suitable correction.<sup>48</sup> Finally, the model’s reliance on large sample sizes can pose challenges in smaller datasets. In such instances, Bayesian logistic regression provides an alternative framework that performs well with limited data.<sup>49</sup>

**PRESENTATION OF FINDINGS AND DISCUSSION**

Table 1 presents a summary of descriptive statistics for the continuous variable. The average age of the head of the household is 43.13 years, with ages ranging from 15 to 100 years and a standard deviation of 16.09, indicating moderate variation. The average dependency ratio is 0.986, suggesting that, on average, the number of dependents (non-working household members) is nearly equal to the number of working members. This ratio ranges from 0 to 8, with a standard deviation of 0.902, reflecting significant variation in dependency across households. Furthermore, the average household size is 4.41 members, ranging from 1 to 22 members, with a standard deviation of 2.09, highlighting the diversity of household compositions within the sample.

**Table 1: Summary Statistics**

Variable	Mean	Std.dev.	Min	Max
Age of Household head	43.12856	16.08531	15	100
Dependency ratio	.9858021	.9022649	0	8
Household Size	4.414553	2.090681	1	22

Table 2 provides a cross-tabulation of employment status based on the gender of the household head, illustrating the distribution of formal and informal employment in both male-headed and female-headed households in Malawi. Among female-headed households, (7.1%) are involved in formal employment, while the majority, (92.9%), participate in informal employment. In comparison, among male-headed households, (18.5%) are engaged in formal employment, whereas (81.5%) are involved in informal employment.

**Table 2 : Gender**

Variables	Gender of the Household Head	
	Female	Male
Formal Employment	7.1	18.5
Informal Employment	92.9	81.5

<sup>45</sup> Hosmer Jr, Lemeshow, and Sturdivant, *Applied Logistic Regression*.

<sup>46</sup> Wooldridge, *Econometric Analysis of Cross Section and Panel Data*.

<sup>47</sup> Gujarati, “Basic Econometrics 4th Ed.”

<sup>48</sup> Gary King and Langche Zeng, “Logistic Regression in Rare Events Data,” *Political Analysis* 9, no. 2 (2001): 137–63.

<sup>49</sup> Hosmer Jr, Lemeshow, and Sturdivant, *Applied Logistic Regression*.

Table 3 illustrates the relationship between employment status and the education level of the household head. Households with No Education: Among the 9,914 households headed by individuals with no formal education, only (12.2%) are engaged in formal employment, while a substantial majority, (87.8%), are in informal employment. Households with Primary Education: In the 654 households with heads who have completed primary education, (22.6%) are in formal employment, and (77.4%) are in informal employment. Households with Secondary Education: Among the 851 households where the head has completed secondary education, (33.7%) are in formal employment, while (66.3%) are in informal employment. Households with Tertiary Education: Of the 200 households headed by individuals with tertiary education, (50.0%) are in formal employment, and (50.0%) are in informal employment.

**Table 3: Educational Level**

Variable	Education Level of Household Head			
	None	Primary	Secondary	Tertiary
<b>Employment Status</b>				
<i>Formal Employment</i>	12.2	22.6	33.7	50
<i>Informal Employment</i>	87.7	77.4	66.3	50

**Logit Regression Model**

The model can specify

$$\ln \left( \frac{p(Y_i = 1|X_i)}{1 - P(Y_i = 1|X_i)} \right) = \beta_0 + \beta_1(\text{employment} - \text{status}) + \beta_2(\text{religion}) + \beta_3(\text{SexHead}) + \beta_4(\text{AgeHead}) + \beta_5(\text{MarriedHead}) + \beta_6(D - \text{ratio}) + \beta_7(\text{education}) + \beta_8(\text{SizeHH}) + \beta_9(\text{residence}) + \beta_{10}(\text{Credit}) + \beta_{11}(\text{shocks}) + \epsilon_i \text{ Equation 5}$$

After estimating the model, the results show that it is significant at the 1% level, as evidenced by a likelihood ratio (LR) chi-squared statistic of 3251.11 and a p-value of 0.0000. This indicates that the predictors significantly contribute to explaining the likelihood of a household being poor. The model's pseudo-R-squared value is 0.2125, suggesting that approximately 21.25% of the variability in the dependent variable (poverty status) is accounted for by the included predictors.

**Employment Status**

Employment status has a significant impact on poverty. Households engaged in informal employment, such as agriculture, casual labor, or business enterprises, are 15.18 percent more likely to experience poverty compared to those in formal wage employment. This underscores the critical need to expand access to formal job opportunities. Mukherjee and Benson noted that employment in secondary industries (manufacturing) was positive but statistically insignificant, while employment in the tertiary sector (sales and service industries) offered welfare benefits in Malawi.<sup>50</sup> These findings support the current study's emphasis on prioritising formal sector job creation as a means to reduce poverty.

**Religion**

In this model, religion does not have a significant effect on poverty, as indicated by a negligible marginal effect and a p-value of 0.956. This implies that, within the Malawian context, religion does not directly affect the likelihood of being poor. The result is consistent with previous studies, which have found the impact of religion on poverty to vary across different contexts.

**Gender of Household Head**

The gender of the household head is another variable analysed in this study. It is a categorical variable coded as 0 for female and 1 for male. The findings reveal that gender is a statistically significant predictor of poverty status in Malawi, with a p-value of 0.000. The coefficient for gender is -0.0507, indicating a negative relationship. Since male is coded as 1, this suggests that the negative coefficient indicates that male-headed households in the sample were 5.07 percentage points less likely to be poor compared to female-headed households. This conclusion aligns with existing literature, such as Maloma and Dunga,

<sup>50</sup> Mukherjee and Benson, "The Determinants of Poverty in Malawi, 1998."

which found that males are statistically less likely to be poor.<sup>51</sup> Similar studies in South Africa by Mdluli and Dunga support this finding, highlighting that women often face greater disadvantages than their male counterparts due to structural inequalities.<sup>52</sup>

### **Age of Household Head**

The age of the household head has a small but significant impact on poverty, with each additional year of age reducing the probability of being poor by 0.15 percent. This suggests that as household heads age, they tend to accumulate more resources and achieve greater economic stability, thereby decreasing their likelihood of falling into poverty. Maloma and Dunga corroborate this observation, noting a negative coefficient for age and an odds ratio below one, indicating a reduced probability of poverty with increasing age.<sup>53</sup> However, some studies, such as Mdluli and Dunga, have found the relationship between age and poverty to be insignificant in certain contexts.<sup>54</sup>

### **Residence**

Geographic location has a significant impact on poverty levels. Households in urban areas are 27 percentage points less likely to be poor than those in rural areas, reflecting the stark rural-urban divide in access to resources, infrastructure, and economic opportunities Mtocha *et al.*, found similar results, indicating that rural households are more likely to experience multidimensional poverty over time compared to their urban counterparts.<sup>55</sup> These findings highlight the importance of targeted rural development policies to bridge this divide.

### **Access to Credit**

Access to credit was also another variable in this study. Households with access to credit are 6.51 percentage points less likely to be poor, as credit enables them to invest in income-generating activities and provides a buffer against financial shocks. This finding aligns with existing literature, including Mtocha *et al.*, who noted that access to credit decreases multidimensional poverty over time by enhancing households' economic resilience.<sup>56</sup>

### **Experiencing Shocks**

Shocks, such as economic or environmental crises, do not significantly impact poverty in this model, as indicated by a marginal effect close to zero. However, contrary findings from Mtocha *et al.*, suggest that experiencing shocks can increase multidimensional poverty scores.<sup>57</sup> The lack of significance in this study may reflect household coping mechanisms or limitations in measuring the frequency or severity of shocks.

**Table 4: Regression analysis**

<b>Variables</b>	<b>dy/dx</b>	<b>Significance level</b>
Employment status	.151779	***
Religion	.000468	
SexHead	-.0506681	***
AgeHead	-.0015313	***
MarriedHead	-.0047249	
Dependency ratio	.0673603	***
Education		
1. Primary	-.1320676	***
2. Secondary	-.1976479	***

<sup>51</sup> Maloma and Dunga, "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic."

<sup>52</sup> Mdluli and Dunga, "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data."

<sup>53</sup> Maloma and Dunga, "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic."

<sup>54</sup> Mdluli and Dunga, "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data."

<sup>55</sup> Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

<sup>56</sup> Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

<sup>57</sup> Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

3. Tertiary	-.2611456	***
Household Size	.069653	***
Residence	-.2699519	***
Access to Credit	-.0650933	***
Experience shocks	.0076548	
*** $p < .01$ , ** $p < .05$ , * $p < .1$		

### **Marital Status**

Marital status does not have a significant impact on poverty in this model ( $p$ -value = 0.734). Whether the household head is married or not appears unrelated to the likelihood of the household being poor. In contrast, Mdluli and Dunga, reported differing results in South Africa, where married heads of households were more likely to be poor, as indicated by a positive coefficient and significant odds ratio.<sup>58</sup>

### **Household Size**

Larger household sizes increase the likelihood of poverty, with each additional member increasing the probability of being poor by 6.97 percent. This finding highlights the resource strain faced by larger families, where limited income must support more individuals. Some scholars observed similar trends, noting that household size significantly increases the probabilities of poverty.<sup>59</sup> The results consistently demonstrate that households with more members encounter greater challenges in escaping poverty.

### **Dependency Ratio**

A higher dependency ratio, indicating more dependents per working adult, is strongly linked to a greater likelihood of poverty. Specifically, a one-unit increase in the dependency ratio increases the probability of poverty by 6.74 percentage points. This result emphasises the financial burden of supporting non-working household members, making it a crucial factor in poverty dynamics.

### **Education Levels**

Education is a significant determinant of poverty. Households led by individuals with primary, secondary, and tertiary education are 13.21, 19.76, and 26.11 percentage points less likely to be poor, respectively, compared to households without education. These findings align with Mtocha *et al.*, who observed that higher education levels notably reduce multidimensional poverty scores.<sup>60</sup> The negative coefficients for education indicate that as educational attainment increases, the chances of falling into poverty decrease significantly. These results underscore the transformative role of education, especially at higher levels, in alleviating poverty and improving the welfare of households.

## **RECOMMENDATIONS**

The study has highlighted various challenges. Addressing these challenges requires revolutionary policy measures that promote equitable and sustainable growth. A primary focus should be on increasing education spending, which encompasses not only expanding access to secondary and tertiary education but also aligning curricula with job market needs through vocational and technical training. Education serves as a powerful tool for alleviating poverty by empowering individuals to escape the intergenerational cycle of poverty and access formal employment opportunities.

Additionally, promoting formal employment and economic diversification is crucial. Malawi must nurture the growth of the private sector, particularly in the manufacturing and service sectors, which possess significant potential for job creation. Enhancing access to loans and business development services for micro, small, and medium-sized enterprises (MSMEs) can stimulate economic activity and reduce reliance on informal labor. It is equally vital to bridge the gap between rural and urban areas. This can be achieved by investing in rural infrastructure, such as roads, electricity, and irrigation systems, to

<sup>58</sup> Mdluli and Dunga, "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data."

<sup>59</sup> Maloma and Dunga, "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic"; Mdluli and Dunga, "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data"; Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

<sup>60</sup> Mtocha, Chirwa, and Mazalale, "Multidimensional Poverty Changes in Malawi."

improve agricultural productivity and market access. Initiatives for rural industrialisation can foster balanced regional development by creating more non-agricultural job opportunities.

Increasing access to financial services and credit is essential to reduce poverty. Initiatives aimed at digital financial inclusion and enhancing microfinance organisations can empower households to invest in profitable ventures and improve their resilience to economic shocks. Additionally, strong social protection measures, such as insurance plans and cash transfers, should be implemented to safeguard vulnerable groups from unforeseen challenges. Given Malawi's high dependency rate, comprehensive family planning and reproductive health services are crucial for alleviating household responsibilities and improving economic participation. To protect rural livelihoods from environmental shocks, agricultural policies must incorporate climate resilience through the adoption of climate-smart technologies and practices. Ultimately, the success of these poverty reduction initiatives depends on strong institutional capacity and effective governance. Strengthening institutional frameworks, promoting transparency, and improving accountability in resource distribution are vital to achieve the desired outcomes in poverty alleviation.

## CONCLUSION

Poverty in Malawi remains a significant issue due to a complex interplay of socioeconomic, demographic, and geographic factors. This study highlights the considerable impact that household size, dependence ratios, education levels, employment status, and geographic location have on poverty. Households at particular risk include those in rural areas, led by individuals with low educational attainment, and reliant on informal employment. Although urban households are generally less likely to experience poverty, rapid urbanisation without effective planning could create urban poverty traps. The persistent rural-urban divide reflects inequalities in access to markets, infrastructure, and basic services, preventing equitable economic progress. High dependency ratios exacerbate the situation by placing immense stress on the income-earning members of households, which, in turn, limits resources available for healthcare, education, and other income-generating activities. Moreover, Malawi's economy remains heavily reliant on subsistence farming, rendering households vulnerable to price fluctuations and climate shocks. Despite notable progress, such as the poverty incidence declining from 70.4% in 2017 to 62.1% in 2019, these advancements are fragile and uneven, particularly in rural areas.

## BIBLIOGRAPHY

- Ali, Asghar, and Sajjad Ali. "Determinants of Poverty in Pakistan." *Pakistan Journal of Humanities and Social Sciences Research* 1, no. 2 (2018): 17–31.
- Biyase, Mduduzi, and Talent Zwane. "An Empirical Analysis of the Determinants of Poverty and Household Welfare in South Africa." *The Journal of Developing Areas* 52, no. 1 (2018): 115–30.
- Boltvinik, Julio. *Poverty Measurement Methods: An Overview*. UNDP Social Development & Poverty Elimination Division. k, 1999.
- Canton, Helen. "Economic Commission for Latin America and the Caribbean—ECLAC." In *The Europa Directory of International Organizations 2021*, 142–44. Routledge, 2021.
- Cebula, Richard J., and Malissa L. Davis. "Determinants of Poverty in the US State of Virginia: An Examination of the Impact of Rent (the Neglected Variable)." *Regional Studies, Regional Science* 9, no. 1 (December 31, 2022): 818–30. <https://doi.org/10.1080/21681376.2022.2151933>.
- Collier, P. *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done about It*. Oxford: Oxford University Press, 2008.
- Creamer, John, Emily A Shrider, Kalee Burns, and Frances Chen. "Poverty in the United States: 2021." *US Census Bureau*, 2022.
- Dewi, Ima Sartika, and Joko Ade Nursiyono. "Determinants of Poverty in East Java During The COVID-19 Pandemic." *EkBis: Jurnal Ekonomi Dan Bisnis* 7, no. 1 (June 17, 2023): 1–11. <https://doi.org/10.14421/EkBis.2023.7.1.1603>.
- Eyasu, Anteneh Mulugeta. "Determinants of Poverty in Rural Households: Evidence from North-Western Ethiopia." *Cogent Food & Agriculture* 6, no. 1 (January 1, 2020): 1823652. <https://doi.org/10.1080/23311932.2020.1823652>.

- Ferreira, F. H. G., and M. Ravallion. "Global Poverty and Inequality: A Review of the Evidence." *World Bank Policy Research Working Paper*, 4623, 2008.
- Fiskal, M. Yusril, and Dyah Titis Kusuma Wardani. "Determinants of Poverty in West Java Province After the Regional Expansion of Pangandaran District." *Journal of Economics Research and Social Sciences* 4, no. 1 (2020). <https://doi.org/10.18196/jerss.040120>.
- Garza-Rodriguez, Jorge, Gustavo A Ayala-Diaz, Gerardo G Coronado-Saucedo, Eugenio G Garza-Garza, and Oscar Ovando-Martinez. "Determinants of Poverty in Mexico: A Quantile Regression Analysis." *Economies* 9, no. 2 (2021): 60.
- Geda, Alemayehu, Niek De Jong, Germano Mwabu, and Mwangi Kimenyi. "Determinants of Poverty in Kenya: A Household Level Analysis." *ISS Working Paper Series/General Series* 347(2001):1–20.
- Gujarati, Damodar N. "Basic Econometrics 4th Ed.," 2002.
- Hosmer Jr, David W, Stanley Lemeshow, and Rodney X Sturdivant. *Applied Logistic Regression*. John Wiley & Sons, 2013.
- Islam, Deen, Jamil Sayeed, and Nazmul Hossain. "On Determinants of Poverty and Inequality in Bangladesh." *Journal of Poverty* 21, no. 4 (2017): 352–71.
- King, Gary, and Langche Zeng. "Logistic Regression in Rare Events Data." *Political Analysis* 9, no. 2 (2001): 137–63.
- Kurniasari, Andini, and Shanty Oktavilia. "Determinants of Poverty in Western Indonesia and Eastern Indonesia." *Economics Development Analysis Journal* 12, no. 1 (2023): 84–99.
- Maloma, Ismael, and Hannah Dunga. "Analysis of Determinants of Poverty in South Africa in the Wake of Covid-19 Pandemic." *International Journal of Research in Business and Social Science (2147- 4478)* 12, no. 4 (June 2023): 400–409. <https://doi.org/10.20525/ijrbs.v12i4.2438>.
- Mdluli, P, and S Dunga. "Determinants of Poverty in South Africa Using the 2018 General Household Survey Data." *Journal of Poverty* 26, no. 3 (April 16, 2022): 197–213. <https://doi.org/10.1080/10875549.2021.1910100>.
- Mtocha, Chrispine Adams, Gowokani Chijere Chirwa, and Jacob Mazalale. "Multidimensional Poverty Changes in Malawi." In *The Palgrave Handbook of Global Social Problems*, 1–31. Springer, 2024.
- Mukherjee, Sanjukta, and Todd Benson. "The Determinants of Poverty in Malawi, 1998." *World Development* 31, no. 2 (February 2003): 339–58. [https://doi.org/10.1016/S0305-750X\(02\)00191-2](https://doi.org/10.1016/S0305-750X(02)00191-2).
- National Statistical Office. *Malawi Poverty Report 2020*. Government of Malawi, 2021. [www.nsomalawi.mw](http://www.nsomalawi.mw).
- Peng, Chenhong, Lue Fang, Julia Shu-Huah Wang, Yik Wa Law, Yi Zhang, and Paul S F Yip. "Determinants of Poverty and Their Variation across the Poverty Spectrum: Evidence from Hong Kong, a High-Income Society with a High Poverty Level." *Social Indicators Research* 144 (2019): 219–50.
- Prasada, Imade Yoga, Tri Fatma Mala Yulhar, and Tia Alfina Rosa. "Determinants of Poverty Rate in Java Island: Poverty Alleviation Policy." *Jurnal Ekonomi Pembangunan* 18, no. 2 (2020): 95–104.
- Rios Avila, Fernando. "Recentered Influence Functions in Stata: Methods for Analyzing the Determinants of Poverty and Inequality." *Levy Economics Institute, Working Paper* 927 (2019).
- Seebohm, Benjamin. *Poverty: A Study of Town Life*. New York: MACMILLAN AND CO. LIMITED, 1909.
- Smith, Adam. *The Theory of Moral Sentiments*. Dover Publications, 1959.
- Wooldridge, Jeffrey M. *Econometric Analysis of Cross Section and Panel Data*. MIT press, 2010.
- World Bank. "Poverty and Shared Prosperity 2020: Reversals of Fortune." The World Bank, 2020.

## **ABOUT AUTHORS**

Steven Henry Dunga is a Professor of Economics at North-West University, Vanderbijlpark, South Africa. His research focuses on development economics, poverty analysis, and household welfare.

Redson Mwandama is a Master's student in Economics at the University of Malawi, Zomba, Malawi. His research interests include poverty dynamics, economic policy, development economics, and sustainable development.