



ECONOMIC SECURITY AMONG ELDERLY PERSONS IN BHUTAN

**A Multidimensional Analysis of Poverty,
Consumption, Income and Social Support**

National Statistics Bureau
Royal Government of Bhutan

FOREWORD

Bhutan's development philosophy, grounded in Gross National Happiness (GNH), recognizes the well-being of all generations as central to national progress. Central to this vision is the principle that no citizen—regardless of age—should be left behind in the pursuit of a flourishing and inclusive society. As Bhutan undergoes a significant demographic transition, with the proportion of elderly persons projected to increase from 8.8% to nearly 20% by 2047, understanding the economic security and well-being of older persons has become an increasingly important national priority.

This report, *Economic Wellbeing of Elderly Persons in Bhutan: A Multidimensional Analysis of Income, Consumption and Social Factors*, presents a comprehensive analysis of the determinants of economic (in)security among Bhutanese aged 60 years and above. Using nationally representative data from the Bhutan Living Standards Survey (BLSS) 2022, the study employs a multidimensional framework to examine the extent and correlates of economic vulnerability among elderly persons. By moving beyond conventional monetary poverty measures—which capture only 12.8% of elderly as poor—the study develops a multidimensional Economic Security Index (ESI) that reveals 38.8% of elderly persons experience overlapping deprivations in economic resources, material wellbeing, health, and social support.

This report forms part of the National Statistics Bureau Thematic Research Series for the Fiscal Year 2025–26, an initiative that promotes analytical research based on official statistics. Through the generation of evidence-based insights into Bhutan's socio-economic, demographic, and cultural landscape, the series aims to strengthen informed policymaking, development planning, and future research. This study contributes to that effort by providing the first nationally representative, multidimensional assessment of elderly economic security in Bhutan.

The findings provide an empirical overview of the factors that shape elderly welfare—including household wealth, education, urban-rural residence, income diversification, and remittance patterns—and their implications for social protection policy. The analysis is intended to support evidence-based discussion and further research on ageing and social protection using official statistics. It is hoped that this report will serve as a useful reference for policymakers, researchers, and other stakeholders interested in elderly welfare, social protection, and population ageing in Bhutan.



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Economic Security among Elderly Persons in Bhutan: A Multidimensional Analysis of Poverty, Consumption, Income and Social Support

ABSTRACT

Population ageing is accelerating in Bhutan, yet evidence on elderly economic security remains limited. This study uses nationally representative data from the Bhutan Living Standards Survey 2022 (N = 73,541 elderly persons) to examine the determinants of economic (in)security among persons aged 60 years and above. We construct a multidimensional Economic Security Index (ESI) using the Alkire-Foster counting method across four domains – economic resources, material well-being, health, and social support – and employ survey-weighted regression models to estimate associations with relative poverty, consumption, ESI deprivation, and total household income.

Findings reveal a striking discrepancy between monetary and multidimensional poverty. While 12.8% of elderly persons are consumption-poor, 38.8% are multidimensionally insecure, with 46.3% classified as vulnerable. Wealth quintile is the strongest predictor, with movement from the poorest to richest reducing poverty by 30.2 percentage points and increasing consumption by 156%. Urban residence reduces poverty by 9.5 percentage points and increases consumption by 28.7%. Income diversification also contributes to economic security, with each additional income source reducing poverty by 4.4 percentage points. Remittance receipt is associated with higher poverty (+4.6 percentage points) and lower consumption (-18.2%), suggesting that remittances primarily flow to poorer households rather than functioning as a pathway out of poverty.

These findings underscore that consumption-based measures alone are insufficient for understanding elderly vulnerability. The findings support policy measures that incorporate multidimensional targeting into social assistance programmes, strengthen asset accumulation, expand pension coverage, invest in rural infrastructure, and support ageing in place through community-based services. This study provides the first nationally representative, multidimensional assessment of elderly economic security in Bhutan, establishing an evidence baseline for SDG monitoring and evidence-based policymaking.

Keywords: Economic security; older persons; multidimensional poverty; Alkire-Foster method; ageing; social protection; Bhutan.

1. INTRODUCTION

Population ageing is emerging as a significant demographic and socio-economic issue worldwide. By 2050, the global population aged 60 years and above is projected to reach 2.1 billion, with the fastest growth occurring in low- and middle-income countries (World Health Organization [WHO], 2022). According to the WHO, healthy ageing depends not only on physical and mental health but also on the economic security that enables older persons to live with dignity and independence (WHO, 2015). Economic security encompasses adequate income, access to essential goods and services, housing quality, social protection, and the capacity to withstand financial shocks (HelpAge International, 2018).

In developing countries, where formal pension systems remain limited and intergenerational co-residence is common, the economic well-being of older persons is closely intertwined with household resources, income structures, and informal social protection mechanisms (Lloyd-Sherlock, 2010; Barrientos, 2015). Unlike in high-income countries, where pensions and private savings constitute the primary sources of old-age income, older persons in low-resource settings often rely on agricultural livelihoods, family transfers, and continued labour-force participation to meet their basic needs. This reliance increases their vulnerability to household-level shocks such as crop failure, illness, or the loss of a primary income earner (Zhang et al., 2018).

Bhutan is also experiencing a gradual demographic transition characterised by population ageing. According to the Population Projection of Bhutan 2017–2047 (NSB, 2019), persons aged 60 years and above accounted for approximately 8.8% of the population in 2017 and are projected to increase to 12.2% by 2032 and 19.7% by 2047. Combined with increasing life expectancy and declining fertility (total fertility rate of 1.9 in 2022; BLSS, 2022), this demographic transition is expected to place growing demands on social protection systems and elderly welfare policies. At the same time, rapid socio-economic transformation, rural–urban migration, and changing family structures raise important questions about the adequacy and sustainability of economic security among older persons. Although household-level poverty estimates are available from the Bhutan Living Standards Survey (BLSS) 2022 (National Statistics Bureau [NSB], 2023), limited empirical evidence exists on the economic security of older persons themselves.

Most of the existing studies on poverty and living standards in Bhutan have focused on households as the unit of analysis. This potentially masks inequalities in resource allocation within households. Older persons, particularly those living alone or in skipped-generation households, may experience economic deprivation even when the household is not classified as poor (Kakwani & Subbarao, 2005). Conversely, those living in multigenerational households may benefit from shared resources (van Vliet, 2011) while also facing risks of dependency, neglect, or limited participation in household decision-making (Cooper et al., 2008). These considerations highlight the importance of examining economic security from the perspective of older persons rather than households alone.

This study addresses this evidence gap by examining the economic security of persons aged 60 years and above using nationally representative data from the Bhutan Living Standards Survey (BLSS) 2022. Treating the older person as the unit of analysis while incorporating household-level economic conditions provides a more nuanced understanding of the factors associated with economic security in later life. Specifically, the study constructs a multidimensional Economic Security Index (ESI), examines the determinants of poverty, household consumption, multidimensional economic insecurity, and household income, and identifies vulnerable subgroups to inform evidence-based policy interventions for Bhutan's ageing population.

2. OBJECTIVES OF THE STUDY

The overall objective of this study is to assess the economic security of elderly persons aged 60 years and above in Bhutan using both monetary and multidimensional approaches.

Specifically, the study aims to:

1. Measure the extent and intensity of multidimensional economic insecurity among the elderly persons.
2. Identify the socioeconomic and demographic determinants of economic insecurity among elderly persons.
3. Examine how different sources of income are associated with economic security, controlling for other covariates.
4. Examine gender, age cohort, and regional disparities in economic security of elderly persons.

3. RESEARCH QUESTIONS

1. What is the extent of economic insecurity among elderly persons in Bhutan?
2. Which demographic and socioeconomic factors are associated with economic insecurity among elderly persons in Bhutan?
3. What role does income structure play in shaping the economic security of elderly persons?
4. Are there significant gender, age cohort, and regional disparities in economic security among elderly persons in Bhutan?

4. THEORETICAL FOUNDATIONS

The analytical framework integrates five complementary theoretical perspectives to explain the determinants of economic security among elderly persons aged 60 years and above in Bhutan. Together, these perspectives provide the conceptual basis for selecting explanatory variables and interpreting the empirical findings.

4.1 Life-Cycle Hypothesis

The Life Cycle Hypothesis (Modigliani & Brumberg, 1954) posits that individuals seek to smooth consumption over their lifetime by accumulating savings during working years and dissaving during retirement. In settings where formal savings instruments and pension coverage are limited, elderly individuals may rely more heavily on family transfers, remittances, continued informal work, or diversified income sources. This framework highlights the importance of pension systems, accumulated assets, income diversification, and intergenerational transfers as mechanisms that sustain consumption and reduce vulnerability in old age (Deaton, 2005). In the Bhutanese context, where family support and public transfers such as Kidu coexist, the Life Cycle Hypothesis provides a foundation for analyzing income composition and asset ownership among elderly persons.

4.2 Capability Approach

The Capability Approach (Sen, 1999, 2009) argues that well-being should be evaluated not merely by income but by individuals' ability to achieve valued functioning, such as being adequately nourished, sheltered, healthy, and socially included. For elderly persons, economic security enhances capabilities by enabling access to healthcare, adequate food consumption, safe housing, and social participation with dignity. This perspective justifies the inclusion of multidimensional indicators – including housing quality, asset ownership, food consumption, and subjective well-being – alongside conventional income measures.

4.3 Social Protection and Welfare Theory

Social protection theory emphasizes the role of public policy in mitigating vulnerability and redistributing resources to disadvantaged groups (Norton et al, 2001). Public transfers such as pensions and state-supported programs (including Kidu), together

with private transfers such as remittances, function as important income-stabilization mechanisms that reduce poverty risk and consumption volatility. In ageing societies, social protection systems provide minimum income guarantees, reduce exposure to shocks, compensate for declining labor earnings, and strengthen household-level resilience. This framework underpins the empirical analysis of pension receipt, remittances, and social transfers as determinants of elderly economic security.

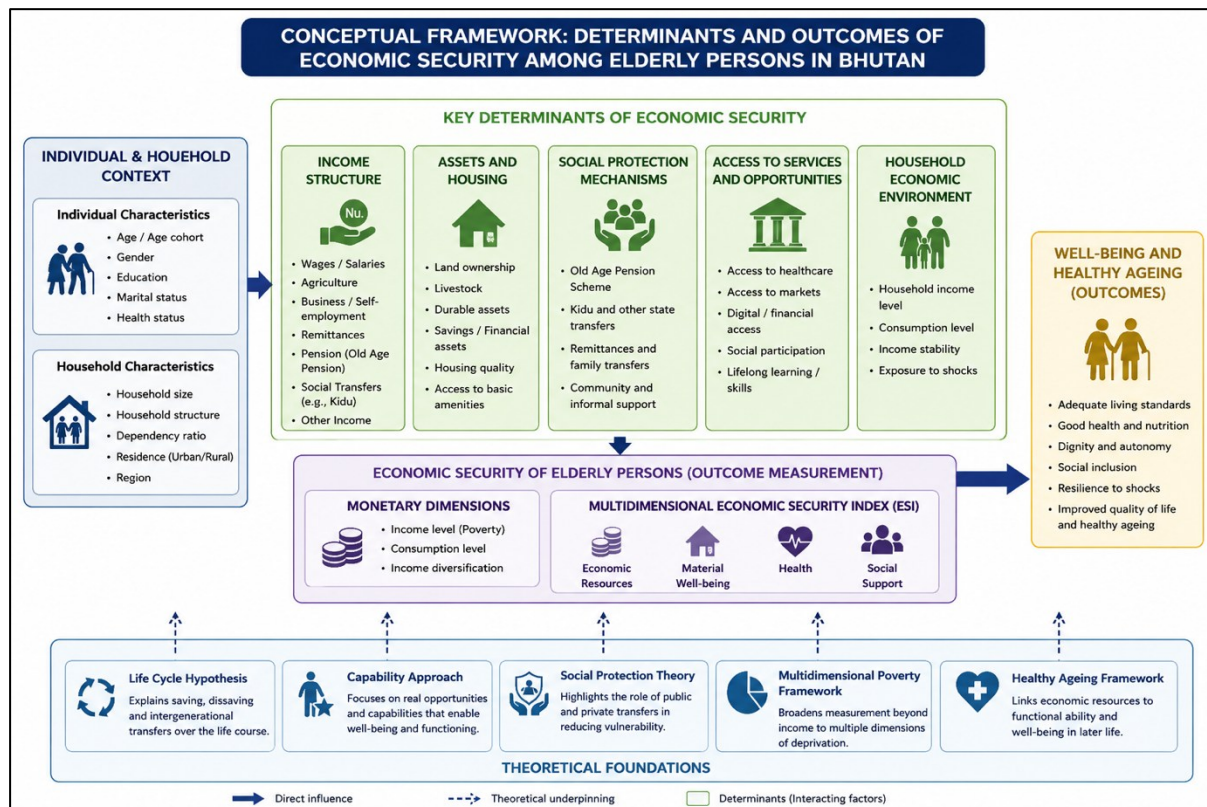
4.4 Multidimensional Poverty Framework

The methodology developed by Alkire and Foster (2007, 2011) is key for multidimensional poverty measurement. Multidimensional poverty approaches conceptualize welfare deprivation as extending beyond monetary poverty. Welfare deficits may arise from inadequate housing, limited asset ownership, poor living conditions, or restricted access to services (Oxford Poverty and Human Development Initiative, 2020). This perspective supports the construction of a composite Economic Security Index (ESI) that integrates economic resources, material well-being, health, and social support. Thus, economic security is operationalized as a multidimensional construct rather than a purely income-based measure.

4.5 Healthy Ageing Framework

The World Health Organization's Healthy Ageing framework (WHO, 2015, 2020) defines healthy ageing as the process of developing and maintaining functional ability that enables well-being in older age. Functional ability depends not only on health status but also on supportive environments, including economic resources (WHO, 2015). Economic security forms a foundational pillar of healthy ageing because it determines access to healthcare, nutritional adequacy, safe and adaptive housing, and autonomy and independence. This framework situates economic security within a broader ageing and development perspective, linking economic determinants to long-term well-being outcomes.

Figure 1: Conceptual Framework



4.6 Conceptual Synthesis

The five theoretical perspectives converge into a unified analytical framework explaining economic security among elderly persons. At the core, the Life Cycle Hypothesis explains how income sources and accumulated assets determine the capacity to sustain consumption in old age. However, income alone does not capture welfare. The Capability Approach expands the framework by emphasizing that economic resources must translate into real opportunities for well-being. Social Protection Theory introduces institutional mechanisms – pensions, transfers, and remittances – that stabilize income and reduce vulnerability. Meanwhile, the Multidimensional Poverty Framework broadens the measurement of economic security to include housing conditions, asset ownership, and living standards. Finally, the Healthy Ageing Framework integrates these economic dimensions into a broader understanding of ageing, where economic security underpins functional ability and dignity in later life.

Together, these perspectives suggest that elderly economic security in Bhutan is determined by the interaction of:

- Individual characteristics (age, gender, education)
- Income structure (wages, agriculture, remittances, pensions, business income, social transfers)
- Asset accumulation and housing quality
- Institutional social protection mechanisms
- The household economic environment

This integrated framework justifies the empirical strategy of analyzing elderly individuals (aged 60+) while incorporating household-level economic conditions as determinants of their welfare.

5. METHODOLOGY

5.1. Data and Sample

This study uses cross-sectional microdata from the Bhutan Living Standards Survey (BLSS) 2022 (NSB, 2023). The BLSS 2022 employs a nationally representative, stratified two-stage sampling design covering all twenty dzongkhags of Bhutan. The analysis is restricted to individuals aged 60 years and above. The unit of analysis is the individual elderly person, while household-level variables—including poverty status, consumption expenditure, housing quality, assets, and income structure—are incorporated as characteristics of the household economic environment.

Due to the cross-sectional nature of the data, the analysis estimates conditional associations rather than causal effects. All econometric models account for survey sampling weights, Primary Sampling Units (PSU), and stratification to ensure nationally representative estimates and correct standard errors (Lumley, 2010).

5.2. Concepts and definitions

Outcome	Description
Relative Consumption Poverty (binary):	1 if household per capita consumption is below 50% of the median per capita consumption (relative poverty line); 0 otherwise. This threshold is defined following the approaches used line used by Wagstaff et al. (2018) and Jolliffe & Prydz (2021).
Log per capita consumption (<i>continuous</i>):	Natural logarithm of per capita consumption (total consumption / Household size)
Economic Security Index (ESI) (<i>count</i>):	Constructed using the Alkire-Foster counting method (Alkire & Foster, 2011). Deprivation is assessed across four dimensions: economic resources, material wellbeing, health, and social support. An elderly person is classified as: <i>Secure</i> (deprived in 0 dimensions), <i>Vulnerable</i> (deprived in 1 dimension), <i>Insecure</i> (deprived in 2 dimensions), or <i>Severely Insecure</i> (deprived in 3+ dimensions).
Total household income:	Total annual household income derived by summing income from wages, agriculture, forestry, cottage industries, business/capital activities, and transfers (including remittances, pensions, and social transfers).

Table 1: Concepts and Definitions

5.3. Key Explanatory Variables

The following explanatory variables are used across the models. By default, base explanatory variables are the reference category.

Variable	Description
Age (<i>continuous</i>)	Age of elderly individual (years).
Gender (<i>Binary</i>)	1 = female, 0 = male
Education (<i>categorical</i>)	No formal education (reference), Primary (grades 1–6), Secondary (grades 7–12), Post-secondary (Diploma and Certificates), Tertiary (Degree, Master, PhD)
Urban/Rural (<i>Binary</i>)	1 = urban, 0 = rural
Wealth Quintile (<i>ordinal</i>)	Wealth quintiles were constructed using an asset-count approach and subsequently divided into quintiles. 1 = Poorest, 2 = Poor, 3 = Middle, 4 = Rich, 5 = Richest (derived from asset counts)
Living Alone (<i>binary</i>)	1 if household size = 1, 0 otherwise
Household Size (<i>discrete</i>)	Total number of household members
Pension Receipt (<i>binary</i>)	1 if receives any pension (Old Age Pension Scheme or private/occupational)
Remittances (<i>binary</i>)	1 if household receives remittances
Income Diversification (<i>count</i>)	Number of distinct income sources (0–6) measured as the count of income-generating sources available to the household.
Region (<i>categorical</i>)	Western (reference), West Central, East Central, Eastern

Table 2: Key Explanatory Variables

District (dzongkhag) fixed effects could not be used because several districts contained fewer poor elderly households, leading to perfect separation in logistic models. Instead, districts are aggregated into four geographic regions based on proximity and economic similarity. The aggregation also ensured sufficient sample sizes within each region for stable statistical estimation.

Table 3: Regions

Region	Dzongkhags Included
Western (reference)	Chukha, Haa, Paro, Samtse, Thimphu
Central West	Dagana, Gasa, Punakha, Tsirang, Wangduephodrang
Central East	Bumthang, Sarpang, Trongsa, Zhemgang
East	Lhuentse, Monggar, Pemagatshel, Samdrupjongkhar, Trashiyangtse, Trashigang

Region fixed effects absorb unobserved heterogeneity across broad geographic areas, including differences in infrastructure, market access, and social service provision.

5.4. ESI Construction

The Alkire-Foster counting approach (Alkire & Foster, 2011) was used to construct the Economic Security Index across four domains:

Table 4: ESI construction metrics

Dimension	Indicators	Deprivation Threshold
Economic Resources	Consumption, assets, coping strategy	Below 50% median consumption; bottom 2 wealth quintiles; no formal coping mechanism
Material Wellbeing	Housing quality, food security, transport	Housing category "Poor"; any food shortage/inadequate diet/no food day.
Health	Self-reported health status	Health status = "sick"
Social Support	Living arrangement, social transfers	Lives alone; receives no pension, remittances, social transfers, or gifts

An individual was classified as deprived in a dimension if deprived in any one indicator within that dimension. The deprivation count (0–4) was summed across dimensions.

Classification: Secure (0 deprivations), Vulnerable (1 deprivation), Insecure (2 deprivations), or severely Insecure (3+ deprivations). The deprivation thresholds were selected based on policy relevance, data availability, and consistency with multidimensional poverty methodologies that identify minimum acceptable standards of economic security, deriving from poverty cutoff from Alkire & Foster (2011).

The ESI is used in two ways throughout the analysis. First, the deprivation count (ranging from 0 to 4) and its associated categories (secure, vulnerable, insecure, and severely insecure) are used for descriptive analysis to examine the distribution and intensity of economic insecurity among elderly persons. Second, for regression analysis, a binary indicator of economic insecurity is constructed, where individuals with two or more deprivations (insecure or severely insecure) are coded as 1 and those with zero or one deprivation (secure or vulnerable) are coded as 0. This dichotomization facilitates the identification of factors associated with multidimensional economic insecurity.

5.5. Model Specifications

To address the study objectives, four regression models were estimated, each corresponding to a different dimension of elderly economic well-being. Together, the models examine monetary poverty, household consumption, multidimensional

economic insecurity, and household income while accounting for the complex survey design of the BLSS 2022.

All models are estimated using the `svyglm` function from the *R survey* package (Lumley, 2010), which accounts for stratification, clustering, and sampling weights. Region fixed effects are included in every specification.

For logistic regression models, Average Marginal Effects (AMEs) are reported in percentage points to facilitate substantive interpretation. For linear models, regression coefficients represent marginal changes in the outcome variable. For the quasi-Poisson model, AMEs are expressed in Bhutanese Ngultrum (Nu.).

5.4.1 Poverty Model (Binary Logistic) Model Specification

$$P_i = \begin{cases} 1 & \text{if individual } i \text{ is poor (relative)} \\ 0 & \text{otherwise} \end{cases}$$

The probability of poverty is estimated using logistic regression:

$$\Pr(P_i = 1|X_i) = \frac{\exp(X_i\beta + \mu_d)}{1 + \exp(X_i\beta + \mu_d)}$$

where X_i includes: age, sex, urban/rural residence, education, pension receipt, remittances, wealth quintile, living alone, household size, income diversification, and region fixed effects μ_d .

5.4.2 Log Consumption Model (Linear OLS)

$$\ln(C_i) = X_i\alpha + \mu_d + \epsilon_i$$

where C_i is per capita consumption, and X_i includes the same set of covariates as the poverty model.

5.4.3 Economic Security Index Model (Linear OLS)

$$ESI_i = X_i\delta + \mu_d + \epsilon_i$$

where ESI_i is the binary outcome derived from the Economic Security Index, taking the value 1 for individuals classified as insecure or severely insecure and 0 for those

classified as secure or vulnerable. X_i includes: age cohort, female, urban, education, living alone, household size, income diversification, and region fixed effects μ_d

5.4.4. Total Household Income Model (Quasi-Poisson)

$$E(Income_i/X_i) = \exp(X_i\theta + \mu_d)$$

where $Income_i$ is total household income, and X_i includes: age, female, urban, education, pension receipt, remittances, living alone, household size, income diversification, and region fixed effects μ_d . The quasi-Poisson family is used to account for over dispersion.

5.5. Diagnostic checks performed:

A series of diagnostic tests was undertaken to assess the validity and robustness of the estimated models. Multicollinearity was evaluated using the Variance Inflation Factor (VIF), with all values below 2.0, well under the commonly accepted threshold of 5, indicating no evidence of problematic collinearity among the explanatory variables. For the household income model, substantial overdispersion was observed; consequently, a quasi-Poisson specification was adopted to obtain consistent standard errors. Model influence was assessed using Cook's distance, which identified a small number of potentially influential observations. Sensitivity analyses excluding these observations produced substantively similar estimates, indicating that the main findings are robust. The distribution of the Economic Security Index (ESI) was also examined and is presented in Section 6.1.4.

6. EMPIRICAL FINDINGS

6.1 Descriptive Statistics

6.1.1 Demographic Characteristics

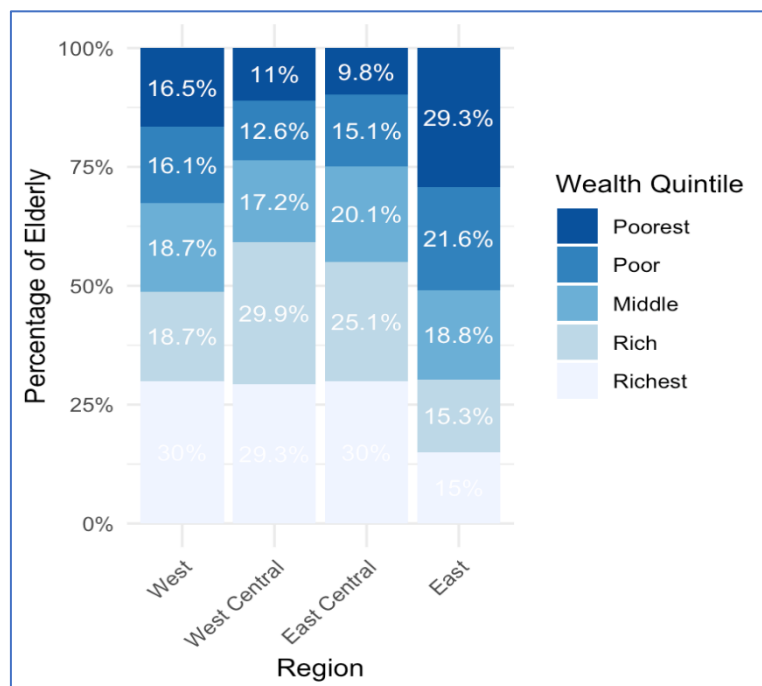
The analytical sample comprised 73,541 elderly persons aged 60 years and above, drawn from 52,596 households. Unless otherwise stated, all descriptive statistics are survey-weighted and nationally representative. The average age was 70.2 years, 49.8% were female, and 81.6% resided in rural areas, reflecting the predominantly rural distribution of Bhutan's elderly population. Average household size was 4.5 members, while only 3.0% of elderly persons lived alone. Approximately 4.2% received a pension, whereas 24.1% lived in households receiving remittances.

Regionally, the Western region accounted for the largest share of elderly respondents (37.9%), followed by the Eastern (28.7%), West Central (18.3%), and East Central (15.1%) regions. These regional differences highlight the importance of controlling for geographic variation in the subsequent multivariable analyses.

6.1.2 Wealth and Asset Distribution

A cross-tabulation of wealth quintiles by geographic region uncovered substantial sub-national disparities (Figure 2). The Eastern region exhibited the highest concentration of economic vulnerability, with 29.3% of its elderly population falling into the poorest quintile – a proportion more than 2.6 times greater than that observed in the East Central region (11.0%). Conversely, this pattern reversed sharply at the upper end of the wealth spectrum. In the West, West Central and East Central regions, approximately 30% of elderly residents were classified within the richest quintile, compared to just 15.0% in the Eastern region. These findings indicate substantial regional inequality in household wealth, with elderly persons in the Eastern region disproportionately concentrated in poorer households, while those in the Western and central regions are more likely to reside in wealthier households. Such disparities are likely to translate into differences in economic security, consumption, and access to essential services.

Figure 2: Wealth Quintile Distribution by Region



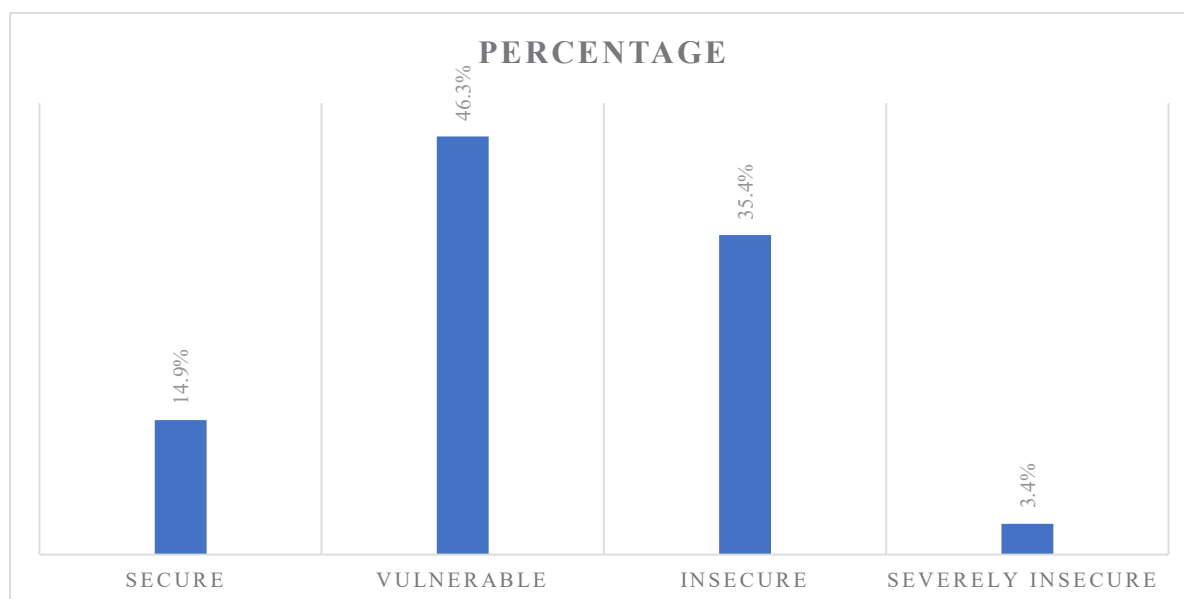
6.1.3 Monetary Poverty

Using a relative poverty threshold defined as 50% of the national median per capita consumption (Nu. 4,258.85 per month), 12.8% of elderly persons were classified as poor. Thus, approximately one in eight elderly persons lived in households with consumption levels substantially below the

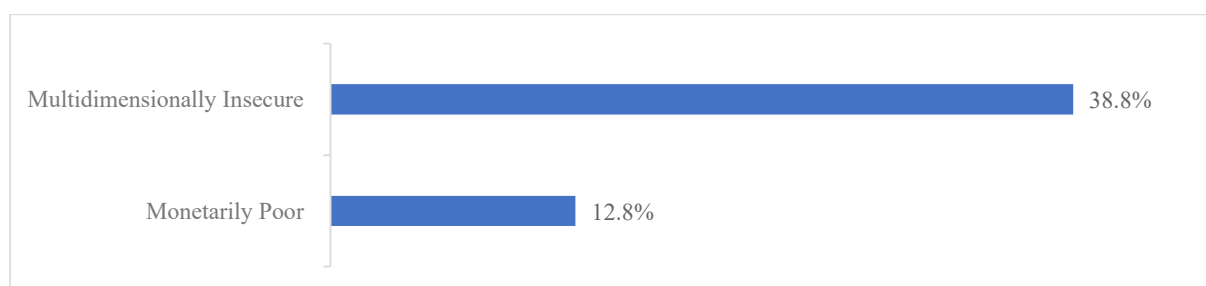
national norm. Although this rate suggests that the majority of elderly persons are not poor by monetary standards, it does not account for other dimensions of deprivation, such as inadequate housing, poor health, or limited social support.

6.1.4 Multidimensional Economic Insecurity

Applying the Alkire-Foster counting methodology with a deprivation cutoff of two or more across the four dimensions, the resulting Economic Security Index (ESI) classified the sample into four ordered categories (Figure 3). The majority of elderly respondents – 46.3% (n = 34,029) – were identified as 'Vulnerable,' experiencing deprivation in one dimension, while only 14.9% (n = 2519) achieved full security across all dimensions. Critically, 35.4% (n = 26,051) and 3.4 % (n=2519) of the elderly population fell into the 'Insecure' and 'Severely Insecure' categories, respectively.

Figure 3: Distribution of ESI Categories in percentage

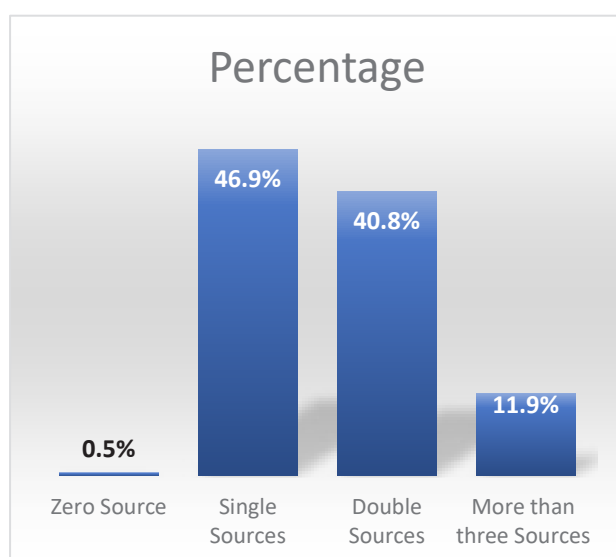
Overall, 38.8% of elderly persons experienced multidimensional economic insecurity (classified as either insecure or severely insecure), compared with only 12.8% identified as poor using the relative consumption measure (Figure 4). The resulting gap of approximately 26 percentage points indicates that monetary poverty substantially underestimates the extent of deprivation experienced by older persons. Many elderly individuals who are not classified as poor nevertheless experience simultaneous disadvantages relating to housing quality, health status, or social support. These findings reinforce the value of adopting multidimensional measures when assessing economic security in ageing populations.

Figure 4: Comparison of monetary poverty vs. multidimensional insecurity

6.1.5 Income Diversification

Nearly half (46.9%) of elderly households relied on a single source of income, indicating potential vulnerability to income shocks (Figure 5). Only 0.5% reported no income source. Descriptive analysis further shows that households with more diversified income portfolios generally reported higher levels of per capita consumption. Although these descriptive patterns do not establish causality, they suggest that income diversification may contribute to greater economic resilience among elderly households. The relatively higher level of diversification observed in the East Central region is also consistent with its comparatively lower incidence of poverty.

Figure 5: Income Diversification Among Elderly Households



Overall, the descriptive findings reveal considerable heterogeneity in the economic circumstances of elderly persons across Bhutan. While consumption-based poverty affects around one in eight elderly persons, multidimensional measures identify almost two in five as economically insecure, highlighting the importance of examining multiple dimensions of

welfare. The following section presents multivariable regression results to identify the demographic, socioeconomic, and regional factors associated with these outcomes after controlling for other characteristics.

6.2 Regression Results

All models were estimated using survey-weighted regression (`svyglm`) to account for clustering, stratification, and sampling weights. For binary logit models (poverty), average marginal effects (AME) are reported in percentage points. For linear models, coefficients are directly interpretable as marginal effects.

6.2.1 Factors Associated with Relative Poverty (Model 1: Logit)

The logistic regression model, estimated using Average Marginal Effects (AME) expressed in percentage points, identified several robust predictors of poverty status among the elderly population (Figure 6). The wealth quintile gradient exhibited the strongest association with lower poverty risk. Moving from the poorest (Q1) to the richest (Q5) quintile reduced the predicted probability of poverty by a substantial 30.2 percentage points ($p < 0.001$), with a clear dose-response relationship across all intermediate quintiles.

Beyond wealth, post-secondary education is associated with a sizeable reduction of 12.8 percentage points ($p < 0.001$) in poverty risk compared to no education. Notably, however, primary, secondary, and tertiary education levels were not statistically significant predictors. This may be because of the limited returns to basic schooling in the context of elderly livelihoods, or due small subsample sizes for higher education levels.

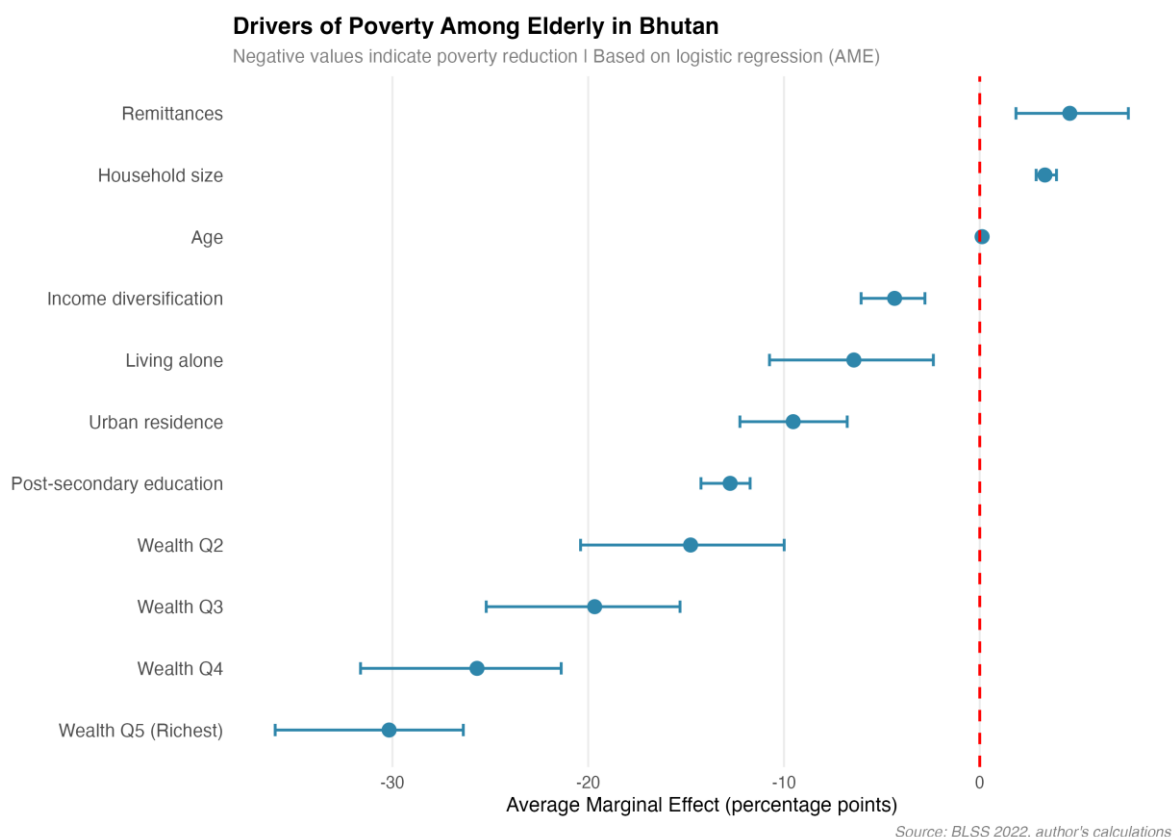
Living in an urban area and living alone each independently reduced poverty probability by 9.5 and 6.4 percentage points, respectively ($p < 0.001$ and $p = 0.003$). It suggests that access to urban infrastructure and reduced household dependency ratios may provide economic advantages that reduce poverty risk. However, this finding should be interpreted cautiously and may reflect characteristics specific to the Bhutanese context.

Income diversification was associated with a lower probability of poverty. Each additional income source reduced poverty risk by 4.4 percentage points ($p < 0.001$), highlighting the importance of diversified livelihood strategies in enhancing economic resilience among elderly households.

Two counterintuitive associations demand in-depth discussion. First, contrary to the expectation that household size operates as a form of risk-pooling, each additional household member was associated with a 3.3 percentage-point increase in poverty probability ($p < 0.001$). This likely reflects that greater consumption demands weaken household resources on a per-capita basis. Second, receiving remittances was paradoxically associated with a 4.6 percentage-point higher poverty risk ($p = 0.002$). This suggests that remittances may flow primarily toward poorer households as a coping mechanism rather than functioning as an ex-ante poverty prevention strategy –

a pattern consistent with the 'distress remittance' hypothesis observed in other developing contexts (Bahati & Waiswa, 2026; Real et al, 2023). Age exerted only a negligible positive effect (+0.12 percentage points per year, $p = 0.018$), while gender and pension receipt did not reach statistical significance ($p > 0.05$).

Figure 6: Coefficient Plot - AME Predictors of Poverty



6.2.2 Determinants of Household Consumption (Model 2: Linear, Log Consumption)

The linear regression of log per capita consumption, estimated using semi-elasticities to facilitate direct percentage-point interpretation, corroborates and extends the findings from the poverty model (Table 5). Wealth disparities were particularly prominent. Elderly persons residing in households belonging to the richest wealth quintile exhibited per-capita consumption levels more than two and a half times those of households in the poorest quintile (+156%, $p < 0.001$).

Beyond wealth, urban residence is associated with a 28.7% higher level of per-capita consumption ($p < 0.001$), while tertiary education – unlike lower educational levels – is associated with a 38.6% higher level of per-capita consumption ($p = 0.002$). This infers that only advanced schooling translates into meaningful consumption gains in

later life. Income diversification, though statistically significant, exerts a more modest effect of +9.8% per additional source ($p < 0.001$).

Two household composition effects warrant careful interpretation. First, living alone is associated with an 18.0% reduction in per capita consumption ($p < 0.001$). This negative association between living alone and consumption contrasts with its negative association with poverty risk observed in Model 1. This likely reflects the distinction between relative poverty status and absolute consumption levels. Single-person households face lower consumption requirements but may nevertheless exhibit lower levels of expenditure due to the absence of shared household resources.

Second, and crucially, each additional household member is associated with a +9.4% increase in per capita consumption ($p < 0.001$). At first glance, this finding appears inconsistent with the poverty model, where larger households were associated with higher poverty risk. However, the two results capture different dimensions of welfare. Larger households face greater consumption requirements, increasing the likelihood of falling below the poverty threshold. At the same time, they may benefit from pooled income, shared resources, and economies of scale, resulting in higher observed per-capita consumption. The balance between these opposing effects likely depends on the number of earners and dependents within the household.

Consistent with the poverty model, households receiving remittances exhibited 18.2% lower per-capita consumption ($p < 0.001$). The persistence of this relationship across multiple welfare measures strengthens the interpretation that remittances are directed toward economically vulnerable households rather than acting as a primary driver of consumption growth.

The Eastern region consistently emerges as the most disadvantaged across multiple welfare dimensions—with 16.8% lower consumption, 4.2 percentage points higher poverty risk, and lower income compared to the Western region. This pattern underscores the need for regionally differentiated policy interventions to address the structural disadvantages facing elderly populations in Eastern Bhutan.

Finally, female elderly persons were associated with slightly higher household consumption levels than their male counterparts, although the magnitude of the effect was relatively small (+3.1%).

Table 5: Linear Regression of Log Per Capita Consumption (Semi-Elasticities)

Predictor Variable	Coefficient (β)	% Change	95% CI	p-value
Wealth Quintile (Baseline: Poorest Q1)				
Quintile 2 (Poor)	0.285	+33.0%	[0.226, 0.344]	<0.001 ***
Quintile 3 (Middle)	0.511	+66.6%	[0.451, 0.571]	<0.001 ***
Quintile 4 (Rich)	0.621	+86.1%	[0.560, 0.683]	<0.001 ***
Quintile 5 (Richest)	0.940	+156.0%	[0.874, 1.006]	<0.001 ***
Residence & Diversification				
Urban (vs. Rural)	0.252	+28.7%	[0.197, 0.307]	<0.001 ***
Income diversification (per source)	0.094	+9.8%	[0.066, 0.121]	<0.001 ***
Education (Baseline: No education)				
Tertiary education	0.326	+38.6%	[0.120, 0.532]	0.002 **
Household Composition				
Household size (per member)	0.090	+9.4%	[0.080, 0.100]	<0.001 ***
Living alone (vs. with others)	-0.199	-18.0%	[-0.307, -0.091]	<0.001 ***
Remittances (Baseline: No)	-0.201	-18.2%	[-0.246, -0.156]	<0.001 ***
Demographics				
Female (vs. Male)	0.031	+3.1%	[0.007, 0.054]	0.011 *
Region (Baseline: West)				
West Central	-0.115	-10.9%	[-0.170, -0.061]	<0.001 ***
East Central	-0.108	-10.2%	[-0.161, -0.055]	<0.001 ***
East	-0.184	-16.8%	[-0.238, -0.130]	<0.001 ***

Note: All coefficients represent semi-elasticities from a log-linear specification. For binary/dummy variables, % change = $(\exp(\beta) - 1) \times 100$. For continuous variables, % change is approximated by $100 \times \beta$.

6.2.3 Multidimensional Economic Insecurity (Model 3: Linear, ESI Binary)

To complement the monetary poverty and consumption analyses, Model 3 employs a linear probability framework to identify correlates of multidimensional economic insecurity ($ESI \geq 2$ deprivations). The results reveal a distinct patterning of risk and protection, diverging in important ways from the previous models (Table 6).

Tertiary education emerges as the strongest correlate of lower multidimensional insecurity, reducing the probability of economic insecurity by 26.1 percentage points ($p < 0.001$). It is more than double the effect of urban residence, which lowers insecurity risk by 15.1 percentage points ($p < 0.001$). These findings underscore the

transformative role of advanced education not only in raising consumption (as seen in Model 2) but also in insulating elderly individuals from overlapping deprivations in housing, health, and social support.

Regional disparities persist: residing in the East Central region reduces insecurity probability by 8.8 percentage points relative to the Western region ($p < 0.001$), suggesting that geographic location shapes multidimensional welfare independently of individual characteristics.

Unlike the poverty and consumption models, each additional household member reduces insecurity risk by 2.8 percentage points ($p < 0.001$). While larger households face higher consumption needs (Model 1) yet achieve higher per capita expenditure (Model 2), they also appear to reduce the likelihood of experiencing simultaneous deprivations across multiple dimensions. This association may reflect the potential benefits of co-residence, whereby larger households are more likely to provide shared caregiving, pooled resources, and stronger informal support networks that reduce simultaneous deprivations among older persons.

Second, and perhaps most critically, income diversification is not significantly associated with multidimensional insecurity ($p = 0.356$). This null finding carries important policy implications. While diversifying income sources improves consumption and reduces monetary poverty, it does not necessarily protect against non-monetary deprivations such as inadequate housing, poor health, or social isolation. These findings suggest that improving multidimensional economic security requires interventions that directly address housing quality, access to healthcare, and social support systems, in addition to policies that promote household income generation.

Finally, age exerts a small but statistically significant positive effect (+0.3 percentage points per year, $p < 0.001$), indicating a gradual increase in the probability of experiencing multiple simultaneous deprivations as individuals advance into older age.

Table 6: Linear Probability Model of Multidimensional Insecurity (ESI Binary)

Predictor Variable	Coefficient (p.p.)	95% CI	p-value
Tertiary education (vs. none)	-0.261	[-0.332, -0.190]	<0.001 ***
Urban residence (vs. rural)	-0.151	[-0.199, -0.103]	<0.001 ***
East Central region (vs. West)	-0.088	[-0.138, -0.038]	<0.001 ***
Household size (per additional member)	-0.028	[-0.036, -0.020]	<0.001 ***
Age (per additional year)	+0.003	[0.0015, 0.0052]	<0.001 ***

Note: Non-significant predictors included income diversification ($p = 0.356$), gender, and other education levels. All coefficients represent percentage-point changes in the probability of being multidimensionally insecure ($ESI \geq 2$).

Other covariates, including gender, pension receipt, living alone, remittances, wealth quintile, and lower educational attainment, were not statistically significant after controlling for other household and demographic characteristics. It indicates that multidimensional economic insecurity is driven more strongly by structural characteristics such as education, geographic location, household composition, and ageing itself.

6.2.4 Household Income Patterns (Model 4: Quasi-Poisson)

To examine the determinants of absolute household income levels, a quasi-Poisson regression was estimated, with results reported as Average Marginal Effects in Ngultrum (Nu) (Table 8). The model yielded fewer statistically significant predictors than the previous models. Households containing elderly persons with secondary education recorded significantly higher annual household incomes—approximately Nu. 1.23 million more than comparable households where the elderly person had no formal education ($p = 0.009$).

Counter to expectations, urban residence did not achieve statistical significance (AME = Nu. 878,709; $p = 0.175$), and the wide confidence interval [-484,246, 2,056,593] suggests substantial heterogeneity in urban income outcomes. This null finding stands in notable contrast observed in both poverty reduction (Model 1) and consumption levels (Model 2). The absence of a statistically significant urban income suggests that the lower poverty rates and higher consumption observed among urban elderly households may arise from differences in access to public services, infrastructure, markets, and lower non-income deprivations rather than substantially higher household earnings.

Household size and living alone showed only marginal evidence of association, with p-values of 0.059 and 0.061, respectively. Both variables are close to conventional significance thresholds and exhibit the expected signs, but the evidence is insufficient to draw firm conclusions regarding their relationship with household income.

Table 8: Quasi-Poisson Regression of Household Income (Average Marginal Effects in Nu.)

Predictor Variable	AME (BTN)	95% CI	p-value
Secondary education (vs. none)	+1,233,643	[62,950, 1,921,285]	0.009 **
Urban residence (vs. rural)	+878,709	[-484,246, 2,056,593]	0.175
Household size (per additional member)	+89,194	[-24,436, 160,459]	0.059
Living alone (vs. with others)	-170,227	[-308,127, 48,294]	0.061

*Significance codes: ** $p < 0.01$; $p < 0.10$. AMEs are expressed in Bhutanese Ngultrum (BTN) and represent the average change in household income associated with each predictor.*

The weaker explanatory power of the income model is unsurprising because household income is inherently more volatile than household consumption, particularly in rural Bhutan where agricultural earnings, seasonal employment, and self-employment fluctuate substantially over time. Consumption tends to be smoother because households draw on savings, transfers, and borrowing to maintain living standards despite temporary income shocks. Consequently, socioeconomic characteristics explain consumption more consistently than annual income.

Cross-Model Integration

Taken together, the three models reveal that elderly economic well-being in Bhutan is shaped by a combination of economic resources, educational attainment, household circumstances, and place of residence. Wealth, education, and urban residence are consistently associated with lower poverty and higher consumption levels, while multidimensional economic insecurity is influenced by a somewhat different set of

structural factors, particularly education, household support structures, and geographic context.

A key finding is that income diversification reduces poverty and increases consumption but does not significantly reduce multidimensional insecurity. This suggests that monetary improvements alone are insufficient to address broader deprivations related to housing quality, health status, and social support. Similarly, household size exhibits contrasting relationships across outcomes, increasing poverty risk while reducing multidimensional insecurity, highlighting the complex role of co-residence and resource sharing in later life. In general, the results demonstrate that conventional monetary indicators capture only part of elderly well-being and underscore the importance of multidimensional approaches for informing social protection and ageing policies in Bhutan.

7. DISCUSSION

This study provides the first nationally representative multidimensional assessment of economic security among elderly persons in Bhutan. Three overarching findings emerge. First, multidimensional insecurity substantially exceeds monetary poverty, indicating that income-based measures underestimate vulnerability among older persons. Second, wealth, education, and urban residence consistently promote economic well-being across multiple outcomes. Third, monetary determinants such as income diversification improve consumption and reduce poverty but do not necessarily protect against multidimensional deprivation. Together, these findings reinforce the importance of adopting broader conceptualizations of economic security for ageing population in Bhutan.

7.1 Life Cycle Hypothesis: Assets as a Key Buffer Against Economic Insecurity

The Life Cycle Hypothesis (Modigliani & Brumberg, 1954) suggests that individuals accumulate assets during their working years and draw upon these resources to sustain consumption in later life. Although the cross-sectional nature of this study does not allow direct observation of lifetime saving and dissaving behaviour, the findings are broadly consistent with this framework. Wealth status emerged as the strongest correlate of monetary well-being across the analyses.

Elderly individuals residing in households belonging to the richest wealth quintile experienced a 30.2 percentage-point lower probability of poverty and substantially higher levels of consumption than those in the poorest quintile. These findings highlight the enduring importance of accumulated assets and economic resources in shaping welfare outcomes during old age.

The findings also indicate that household size plays a complex role in economic security. Larger households were associated with a higher probability of poverty but also with higher per-capita consumption. This suggests that larger households simultaneously face greater consumption requirements while benefiting from resource pooling and shared economic activities. These associations are not contradictory because poverty is measured relative to a threshold, whereas consumption reflects average expenditure. The balance between these opposing forces likely depends on household composition, particularly the ratio of earners to dependents.

Policy implication: The findings suggest that policies supporting asset accumulation throughout the life course—including access to productive assets, housing, savings mechanisms, and livelihood opportunities—may contribute to greater economic security in old age.

7.2 Capability Approach and Multidimensional Poverty: Beyond Income

The Capability Approach (Sen, 1999, 2009) argues that well-being should be assessed not only in terms of income but also in terms of individuals' ability to achieve valued functionings and participate fully in society. The multidimensional poverty framework developed by Alkire and Foster (2011) operationalizes this perspective by recognising that deprivation can occur across multiple domains simultaneously.

The findings strongly support this broader understanding of well-being. Tertiary education was associated with a 26.1 percentage-point reduction in multidimensional insecurity and a 38.6% increase in consumption. Importantly, the influence of education appears to extend beyond income generation alone. Education may enhance health literacy, improve access to information and services, strengthen social networks, and increase the ability to navigate formal institutions, including pension and social assistance programmes.

The results relating to living arrangements further illustrate the distinction between monetary and multidimensional well-being. Living alone was associated with a lower probability of poverty but also with lower levels of consumption. From a capability perspective, living independently may represent an important valued functioning that preserves autonomy and dignity. However, it may also be associated with reduced economies of scale, weaker social support networks, and increased vulnerability to isolation.

Policy implication: Policies focused exclusively on income poverty may overlook significant deficits in housing quality, health, and social support. Incorporating multidimensional indicators into programme targeting and monitoring could improve the identification of vulnerable elderly persons and strengthen the effectiveness of social assistance programmes such as Kidu.

7.3 Social Protection Theory and the Remittance Paradox

Social protection theory emphasizes the role of transfers and public support systems in reducing vulnerability and enhancing resilience (Norton et al, 2001). Under this framework, pensions, remittances, and social transfers are expected to strengthen household welfare and mitigate economic risk.

However, the findings reveal a more nuanced picture. Receipt of remittances was associated with a 4.6 percentage-point higher probability of poverty and approximately 18% lower consumption. Although the data do not permit causal interpretation, this pattern is consistent with remittances being directed towards economically vulnerable households rather than functioning as a primary pathway out of poverty.

The consistency of this finding across both the poverty and consumption models suggests that remittances may operate primarily as coping mechanisms for households already experiencing economic disadvantage. Similar patterns have been observed in other developing-country contexts, where migration-related transfers are often targeted towards households facing economic hardship (Bahati & Waiswa, 2026; Real et al, 2023).

Policy implication: While remittances remain an important source of support for many households, they should not be viewed as a substitute for formal social protection systems. Strengthening pension coverage, social assistance programmes, and community-based support mechanisms remains essential for reducing vulnerability among older persons.

7.4 Income Diversification and Economic Security

Income diversification was consistently associated with better monetary outcomes among elderly households. Each additional income source was associated with a 4.4 percentage-point reduction in poverty risk and a 9.8% increase in consumption. However, findings show elderly people have low level of income diversification (mean = 1.19 sources) with 61.6% of elderly households having one- or zero-income sources, a single income shock—such as loss of agricultural income, reduction in remittances, or cessation of pension payments—could push these households into poverty. These findings are consistent with the Life Cycle Hypothesis and broader livelihood frameworks, which suggest that multiple income streams help reduce exposure to economic shocks and improve household resilience.

However, income diversification was not significantly associated with multidimensional economic insecurity. This distinction is important. While diversified income sources appear to improve monetary welfare, they do not necessarily address deprivations related to housing quality, health status, or social support.

This finding suggests that improvements in income alone may be insufficient to eliminate broader forms of vulnerability experienced by older persons.

Policy implication: Programmes that promote livelihood diversification, skills development, access to credit, and income-generating activities can contribute to poverty reduction and improved consumption. However, these interventions should be complemented by investments in housing, healthcare, and social support services to address multidimensional insecurity.

7.5 Urban-Rural Disparities in Elderly Well-Being

Urban residence was consistently associated with more favourable outcomes across all measures of welfare. Elderly individuals living in urban areas experienced lower poverty rates, higher consumption levels, and lower levels of multidimensional insecurity compared with their rural counterparts.

These differences likely reflect broader structural disparities between urban and rural areas, including variations in market access, transport infrastructure, healthcare availability, social services, and economic opportunities. Importantly, the urban advantage persisted even after controlling for education, household characteristics, and other socioeconomic factors, suggesting that location itself remains an important determinant of elderly well-being.

Policy implication: Continued investment in rural infrastructure, healthcare services, transportation networks, and local economic development is necessary to reduce spatial inequalities and ensure that older persons in rural areas are not left behind.

7.6 Healthy Ageing and Economic Security

The World Health Organization's Healthy Ageing Framework (WHO, 2015; 2020) emphasizes that healthy ageing depends not only on individual health status but also on supportive social and physical environments that enable older persons to maintain functional ability and independence.

The findings suggest that economic security is closely intertwined with these broader determinants of healthy ageing. Education was associated with lower multidimensional insecurity, while urban residence was associated with better outcomes across all measures of well-being. These factors may strengthen older persons' ability to access healthcare, obtain information, participate in social life, and maintain independence.

From this perspective, economic security should not be viewed solely as an economic objective. Rather, it represents a foundational condition that enables older persons to achieve dignity, autonomy, and well-being throughout later life.

Policy implication: Policies promoting healthy ageing should integrate income support, healthcare access, age-friendly infrastructure, and community-based social support systems rather than treating these areas as separate policy domains.

7.7 Monetary Poverty and Multidimensional Insecurity: The Central Policy Message

Perhaps the most important finding of this study is the substantial divergence between monetary poverty and multidimensional insecurity among elderly persons in Bhutan. While only 12.8% of elderly individuals were classified as poor using the relative consumption poverty measure, 38.8% were classified as multidimensionally insecure according to the ESI.

This discrepancy suggests that many elderly persons who are not considered poor by conventional monetary standards nevertheless experience simultaneous deprivations in areas such as housing quality, health status, and social support. Consequently, income-based measures alone systematically underestimate the extent of elderly vulnerability in Bhutan.

The findings reinforce international evidence that multidimensional approaches provide a more comprehensive understanding of well-being in later life and offer a stronger foundation for policy design, programme targeting, and monitoring of ageing-related Sustainable Development Goal indicators.

Policy implication: Future social protection and elderly welfare policies in Bhutan should complement traditional poverty measures with multidimensional indicators to better identify vulnerable populations and ensure that support reaches those experiencing multiple forms of deprivation.

8. POLICY IMPLICATIONS

The empirical findings demonstrate that elderly economic security in Bhutan is multidimensional and influenced by a combination of household wealth, education, income diversification, geographic location, and social support. Importantly, multidimensional insecurity substantially exceeds monetary poverty, suggesting that conventional income-based approaches alone are insufficient for identifying vulnerable older persons. The following policy recommendations build directly on these findings and are intended to support evidence-informed planning for an ageing Bhutan.

8.1 Strengthening Asset Accumulation and Income Diversification

The analyses consistently identify household wealth as one of the strongest correlates of elderly well-being. Elderly individuals residing in wealthier households experience substantially lower poverty rates and higher levels of consumption than those in poorer households. These findings highlight the importance of asset accumulation over the life course in supporting economic security during old age.

Policies that promote asset formation among working-age populations may therefore contribute to improved well-being in later life. Such measures could include support for productive assets, housing ownership, savings programmes, and access to financial services, particularly in rural areas where formal retirement savings opportunities remain limited.

Income diversification also appears to play an important role in improving monetary welfare. Each additional income source was associated with lower poverty risk and higher consumption levels. Expanding opportunities for livelihood diversification through skills development, access to credit, support for small enterprises, and agricultural value-chain development may therefore enhance household resilience and reduce vulnerability among older persons and their families.

8.2 Strengthening Social Protection and Improving Targeting Mechanisms

One of the most significant findings of this study is the divergence between monetary poverty and multidimensional economic insecurity. While 12.8% of elderly persons were classified as poor using the relative consumption measure, 38.8% were classified as multidimensionally insecure. This suggests that many older persons

experience simultaneous deprivations in housing, health, and social support despite not falling below conventional poverty thresholds.

The findings indicate that reliance on income-based targeting alone may overlook a substantial proportion of vulnerable elderly individuals. Policymakers may therefore consider complementing existing poverty measures with multidimensional indicators when designing and targeting social assistance programmes. The Economic Security Index developed in this study provides one potential framework for identifying older persons experiencing multiple forms of deprivation.

The analysis also suggests that remittance-receiving households tend to be economically more vulnerable than non-recipient households. While remittances remain an important source of support, they do not appear to function as a reliable substitute for formal social protection mechanisms. Continued efforts to strengthen the adequacy, coverage, and sustainability of pension and old-age support programmes therefore remain important.

Given Bhutan's growing elderly population and the large proportion of older persons engaged in informal and agricultural livelihoods throughout their working lives, consideration may also be given to expanding the adequacy and inclusiveness of old-age income support mechanisms.

8.3 Reducing Urban-Rural Disparities

The regression results indicate that elderly persons living in Eastern Bhutan experience systematically poorer outcomes across several welfare measures, suggesting that geographically targeted interventions may be particularly beneficial.

Reducing these disparities will require sustained investment in rural development. Priority areas include transport connectivity, healthcare services, digital infrastructure, financial inclusion, and local economic development initiatives that improve access to markets and services. Such investments can help ensure that elderly persons residing in rural areas are able to benefit from opportunities and services comparable to those available in urban centres.

8.4 Preparing for Population Ageing and Supporting Ageing in Place

Bhutan is entering a period of demographic transition in which the proportion of older persons is expected to increase steadily over the coming decades. Because only a small proportion of elderly individuals currently live alone, Bhutan has an opportunity to establish community-based support systems before demographic ageing accelerates further. Rapid changing family structures, declining fertility, and increasing migration may contribute to greater social isolation among future cohorts of older persons.

The findings suggest that living alone is associated with lower levels of consumption and may increase vulnerability to broader forms of deprivation. As population ageing accelerates, greater attention may therefore be required to support ageing in place through community-based services and age-friendly environments.

Potential interventions include regular health and wellness outreach programmes, community care initiatives, home-based support services, social participation programmes, and mechanisms for identifying and assisting isolated elderly individuals. Early investment in such systems may reduce future pressures on institutional and health-care services while promoting dignity and independence in later life.

8.5. Education

Although educational attainment cannot be modified among the current elderly population, the strong association between higher education and improved economic security highlights the importance of investments in education across the life course. Today's educational investments are likely to influence economic resilience and healthy ageing among future generations of older persons.

8.6. Way Forward

These findings suggest that preparing for population ageing requires moving beyond traditional poverty reduction strategies towards a comprehensive framework for economic security. Such a framework should combine income support with investments in housing, healthcare, community services, productive assets, and geographically equitable development. By adopting a multidimensional approach, Bhutan can better anticipate the challenges of demographic transition while promoting healthy ageing, dignity, and independence for its growing elderly population.

The Economic Security Index developed in this study may also serve as a baseline monitoring tool for tracking elderly well-being over time and evaluating progress towards national development priorities and the Sustainable Development Goals.

9. LIMITATIONS

9.1 Methodological and Design Constraints

Several methodological limitations must be considered when interpreting the findings of this study. First, the cross-sectional design precludes any causal inference; all reported associations—including the strong wealth-poverty gradient and the urban consumption premium—should be interpreted as correlational rather than causal. Relatedly, potential endogeneity remains a concern, as unobserved confounders such as lifetime savings behaviour, health status, informal support networks, and intergenerational transfers may be correlated with both wealth, education, and the welfare outcomes examined. While the quasi-Poisson, linear, and logistic specifications control for a range of observed covariates, the possibility of omitted variable bias cannot be entirely discounted.

A further limitation relates to the unit of analysis. Although the study treats the elderly individual as the analytical unit, many key explanatory and outcome variables—including income, consumption, wealth, and housing conditions—are measured at the household level. Consequently, the analysis captures the economic environment in which elderly persons reside but may not fully reflect intra-household inequalities in resource allocation, decision-making power, or access to household resources.

9.2 Measurement and Data Quality Issues

The study relies on self-reported survey data, which introduces the risk of recall error and social desirability bias, particularly in the reporting of income, remittances, and transfer receipts. Informal income sources and non-monetary transfers may be underreported, potentially affecting estimates of household economic resources.

Furthermore, the construction of the Economic Security Index (ESI)—while methodologically grounded in the Alkire-Foster framework—inherently involves normative choices regarding deprivation thresholds and classification cut-offs. Sensitivity analyses using alternative thresholds may yield different prevalence estimates, and readers should therefore interpret the estimated multidimensional insecurity rate of 38.4% as an evidence-based approximation rather than a definitive measure.

The analysis is also constrained by the indicators available within the Bhutan Living Standards Survey. Important dimensions of elderly well-being—including mental health, functional limitations, social participation, caregiving arrangements, loneliness, and subjective life satisfaction—could not be incorporated into the Economic Security Index. As a result, the ESI should be viewed as a partial measure of economic security rather than a comprehensive assessment of overall well-being in old age.

9.3 Analytical and External Validity Constraints

The sample contained a relatively small number of severely insecure elderly individuals ($n = 217$), limiting statistical power for detecting predictors of this extreme outcome. Type II errors are therefore possible, meaning that meaningful associations may not have been identified for this subgroup.

Similarly, while regional fixed effects were included, the analysis was conducted at a broad geographic level, which may mask substantial within-region heterogeneity—particularly between remote rural communities, semi-urban settlements, and urban centres. Future research could benefit from more geographically disaggregated analyses where sample sizes permit.

Despite these limitations, several findings were consistently observed across multiple model specifications and outcome measures. In particular, wealth, education, and urban residence emerged as important correlates of elderly welfare across both monetary and multidimensional indicators. While the magnitude of specific associations should be interpreted with appropriate caution, the overall patterns provide a credible empirical foundation for policy dialogue and future research on population ageing in Bhutan.

Future research would benefit from longitudinal data that allows examination of transitions into and out of economic insecurity, improved measurement of pension and transfer income, and the incorporation of broader dimensions of elderly well-being, including health, social participation, and functional ability.

10. CONCLUSION

This study provides the first nationally representative multidimensional assessment of the economic security of older persons in Bhutan. Using data from the Bhutan Living Standards Survey 2022 covering 73,541 individuals aged 60 years and above, the study combined monetary and multidimensional approaches to examine the socioeconomic factors associated with economic security in later life. By analysing relative poverty, household consumption, multidimensional economic insecurity, and household income, the study offers a comprehensive evidence base for understanding elderly well-being in Bhutan.

The findings demonstrate that monetary indicators alone substantially underestimate the extent of vulnerability among older persons. Although only 12.8% of elderly persons were classified as poor using the relative consumption poverty measure, 38.8% experienced multidimensional economic insecurity, reflecting overlapping deprivations in economic resources, material well-being, health, and social support. This discrepancy highlights the importance of adopting broader measures of well-being when assessing the circumstances of older persons.

Across all analyses, household wealth emerged as the strongest correlate of elderly economic well-being, while urban residence and higher educational attainment were consistently associated with more favourable outcomes. Income diversification reduced poverty and increased household consumption but did not significantly reduce multidimensional insecurity, indicating that improvements in income alone are insufficient to address wider deprivations. Conversely, remittances were associated with poorer monetary outcomes, suggesting that they primarily function as coping mechanisms for already vulnerable households rather than as drivers of economic advancement.

These findings have important implications for policy. As Bhutan's population continues to age, strengthening economic security among older persons will require a multidimensional approach that extends beyond income support. Integrating multidimensional indicators into social protection programmes could improve the identification of vulnerable elderly persons who may not be captured by conventional poverty measures. At the same time, policies that promote asset accumulation throughout the life course, expand livelihood opportunities, strengthen pension and

social assistance systems, reduce rural–urban disparities, and support ageing in place through community-based services can contribute to improving well-being in later life.

Beyond its policy relevance, this study contributes to the growing international literature on ageing and multidimensional welfare by demonstrating that economic security is a multidimensional concept that cannot be adequately captured through monetary measures alone. It also establishes an important empirical baseline for monitoring population ageing in Bhutan and provides a foundation for future research using longitudinal data to examine transitions into and out of economic insecurity.

Ultimately, ensuring that older persons are able to live with dignity, security, and independence is central to Bhutan’s development aspirations. By recognising and addressing the multiple dimensions of economic insecurity experienced in later life, Bhutan can strengthen evidence-based policymaking while advancing its commitment to inclusive development and the principles of Gross National Happiness.

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Annexure 1: Average Marginal Effects (AME) of Predictors of Poverty among Elderly Households.

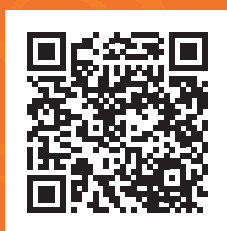
Predictor Variable	AME (p.p.)	95% CI	p-value
Wealth Quintile (Baseline: Poorest Q1)			
Quintile 2 (Poor)	-14.77	[-20.39, -9.99]	<0.001 ***
Quintile 3 (Middle)	-19.67	[-25.21, -15.31]	<0.001 ***
Quintile 4 (Rich)	-25.68	[-31.63, -21.38]	<0.001 ***
Quintile 5 (Richest)	-30.17	[-35.99, -26.38]	<0.001 ***
Education (Baseline: No education)			
Post-secondary education	-12.75	[-14.24, -11.73]	<0.001 ***
Residence (Baseline: Rural)			
Urban residence	-9.53	[-12.25, -6.77]	<0.001 ***
Living Arrangement (Baseline: With others)			
Living alone	-6.43	[-10.74, -2.37]	0.003 **
Income Diversification (per additional source)	-4.35	[-6.06, -2.80]	<0.001 ***
Remittances (Baseline: No)	+4.60	[1.85, 7.59]	0.002 **
Household Size (per additional member)	+3.33	[2.88, 3.92]	<0.001 ***
Age (per additional year)	+0.12	[0.02, 0.22]	0.018 *

Notes: Non-significant predictors ($p > 0.05$) included gender ($p=0.970$), primary education ($p=0.294$), secondary education ($p=0.317$), tertiary education ($p=0.230$), and pension receipt ($p=0.623$). Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.



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