Number of Elderly in the Household and Elderly Household Welfare

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Article Information

Abstract

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The decline in fertility and mortality in Indonesia has led to an increase in the number of households with elderly members (aged 60 and above). However, their level of well-being is relatively lower. This gives rise to socio-economic problems such as the neglect of the elderly, a decrease in the quality of human resources, and an increase in government expenditure to enhance the well-being of the elderly generation. Policies to anticipate and address these issues must be formulated based on population analysis. This study examines the relationship between the number of elderly individuals in a household and the household's well-being. Using data from 86,927 elderly households from the March 2019 National Socio-economic Survey (Susenas) and multiple regression analysis, the research finds that the number of elderly individuals is significantly associated with lower household well-being. The presence of elderly members in elderly households significantly impacts the lower household well-being ratio compared to the number of adults or children. The study also discovers that income, region, location, household members' awareness of optimizing healthcare services, and the duration of education and age of the household head are positively correlated with better well-being in elderly households. Meanwhile, male household heads correlate significantly with a lower well-being ratio than female household heads.

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INTRODUCTION

The decline in birth and death rates in Indonesia has led to a continuous increase in the number of households with elderly members (individuals aged 60 and above, in accordance with Law Number 13 of 1998). The results of the Population Census for 1971-2020 indicate a rising trend in the population aged 15 and above. Conversely, the number of children continues to decrease. With the increasing number of elderly individuals, the demand for elderly care and health services due to disability issues and illnesses is also on the rise (Wuryandari, 2015; Breyer and Lorenz, 2019; Oudmane, Mourji and Ezzrari, 2019; Rivera-Almaraz et al., 2019). This will be accompanied by an increase in the cost of living for the elderly in Indonesia. However, the decrease in productivity and low educational levels result in their wages being low. The limitations in economic resources to meet their needs also make them dependent on more productive family members (Kidd et al., 2018). The low well-being of the elderly will also impact the increase in government spending on elderly welfare. The National Medium-Term Development Plan (RPJMN) 2020-2024 indicates that targets for the social rehabilitation of the elderly, social assistance for the elderly, and the Elderly Family Development Program (Bina Keluarga Lansia or BKL) are planned to continue increasing until 2024.

The number of households with elderly members (elderly households) continues to increase, unfortunately, with a low level of well-being. The elderly contribute to their household expenditures. Song and Zhang (2018) mention that per capita consumption in China is lower due to the presence of the elderly. Additionally, Han and Cheng's (2020) research shows that the presence of household members (household members in elderly households) in the young, middle-aged, and elderly age groups has a positive and significant impact on the increase in household expenditures in China. In Indonesia, research by Wuryandari (2015) found that households consisting only of the elderly have the highest percentage of food expenditures

compared to other types of households, and the presence of both elderly and children in households is related to an increase in health expenditures. The low well-being of elderly households raises socio-economic problems such as the neglect of the elderly (American Psychological Association, 2012; Maulana, et al., 2016), a decrease in human resource quality (Kidd et al., 2018; Nazara, 2018), as well as an increase in government spending to improve the well-being and develop the elderly generation (Sriyana, 2008; Nagarajan, Teixeira and Silva, 2016). To anticipate and address these issues, government social spending policies need to be based on population analysis at the household level in the current conditions.

In the National Medium-Term Development Plan (RPJMN) 2020-2024, the government's efforts to carry out social rehabilitation for the elderly are continuously intensified by targeting the number of elderly individuals participating in the Elderly Social Rehabilitation Program (Progres Lansia) and receiving support from their families until 2024 (covering 35,000 individuals and 16% of families with elderly members). The targeted percentage of elderly households receiving social assistance is also set to increase continuously until 2024 (25% of the total elderly households in Indonesia). Additionally, the Elderly Family Development Program (Bina Keluarga Lansia or BKL) aims to continually increase its numbers, reaching 10,214 groups by 2024 to cultivate resilient elderly individuals who have harmonious relationships with their families. Government policies in preparing the elderly are essential to play a role as the second demographic bonus in supporting the capital-to-labor ratio, productivity, and per capita income (Lee and Mason, 2006). The effort to optimally obtain the second demographic bonus undoubtedly poses challenges, one of which is the government's fiscal limitations in enhancing the well-being of the elderly and their families who are poor or vulnerable.

Household well-being can be assessed by the magnitude of household expenditures in meeting its minimal needs, which refer to the

poverty line (World Bank, 2019). Households with a well-being ratio below one are classified as poor, with values between 1 and less than 1.5 considered vulnerable, values between 1.5 and less than 3.5 as aspiring middle class, values between 3.5 and less than 17 as middle class, and values 17 and above as upper-class households. Mankiw, Quah, and Wilson (2012) put forth two foundations of consumer decisions in optimally spending to meet basic needs at a certain satisfaction level or minimal well-being level: budget constraints and consumer preferences (Consumer Choice Theory). Additionally, the Life Cycle Consumption Hypothesis Model, developed by Modigliani, Ando, and Brumberg, explains that an individual's utility in consumption varies throughout their life cycle. An individual maximizes utility based on current income, wealth accumulation from the past, and future income expectations closely tied to their life stage.

Research by Wuryandari (2015), Song and Zhang (2018), and Han and Cheng (2020) indicates a relationship between the different age levels of household members and the level of household expenditures. The study by Han and Cheng (2020) demonstrates that the number of household members with varying age levels is significantly positively correlated with household consumption levels. Income available to meet household needs also correlates positively with household expenditures (Rufino, 2016; Illahi, Adry, and Triani, 2018; Puspita and Agustina, 2019). From a demographic perspective, the older age of the household head (head of the household) and higher educational levels are associated with increased household expenditures (Gounder, 2012; Lekobane and Seleka, 2017; Maniriho et al., 2021). Additionally, male household heads are associated with higher household expenditures compared to households led by females (Wuryandari, 2015; Lekobane and Seleka, 2017; Maniriho et al., 2021). Economically, household heads who work are related to higher household expenditures (Wuryandari, 2015; Lekobane and Seleka, 2017; Astuti, 2018). Households owning their own homes have higher household

expenditures (Gounder, 2012; Wuryandari, 2015; Maniriho et al., 2021). Furthermore, from a non-economic perspective, households located in urban areas are associated with higher household expenditures compared to those in rural areas (Gounder, 2012; Wuryandari, 2015; Lekobane and Seleka, 2017; Puspita and Agustina, 2019; Maniriho et al., 2021). Meanwhile, households in regions with higher economic levels have higher household expenditures than those in areas with lower economic levels (Gounder, 2012; Wuryandari, 2015; Rufino, 2016). Additionally, the awareness of family members to maintain health is also associated with lower health expenditures (Christensen et al., 2009).

The increasing number of elderly individuals and elderly households in the population poses challenges to economic growth, healthcare systems, pension systems, and the well-being of the elderly themselves (Bloom et al., 2011). This addition will negatively impact a country's productivity, indirectly affecting economic growth (Sugiyanto and Kurniawati, 2021). Indonesia has already become a country with an aging population structure since 2021. Furthermore, 30.79% of households in Indonesia will be elderly households in 2022 as the economic conditions of Indonesia gradually recover after the pandemic. Meanwhile, 41.11% of the elderly live in households within the lowest four deciles (Badan Pusat Statistik, 2022), and 82.99% of elderly household economies rely on working household members, which is an increasing trend compared to 2019 when it was only 79.91%. The National Medium-Term Development Plan (RPJMN) 2020-2024 states that the low well-being of the elderly and their households compared to other age groups is a problem that has not been optimally addressed. The low well-being of the elderly has the potential to increase incidents of discrimination, violence, and neglect towards them. The growing number of elderly individuals in Indonesia with low well-being could burden their families and hinder Indonesia's future economic growth. The condition of Indonesia's elderly population, who are poor and vulnerable, and their numbers

within households, which may affect expenditures for other family members, needs to be examined more deeply.

Research that considers the impact of the number of elderly individuals in households on household well-being in Indonesia is still limited. Research by Wuryandari (2015), which used data from the National Socio-economic Survey (Susenas) in 2011, only considered household types based on age composition and did not analyze based on the number of household members in each age group, as done by Han and Cheng (2020) in China. Therefore, this research aims to analyze the well-being of elderly households by considering the number of household members based on age composition (elderly, adults, and children) and other factors related to a household's ability to meet the minimal needs of its members (food and non-food needs, calculated in terms of the poverty line by the Central Statistics Agency or BPS). This study is expected to provide an analysis of how the number of elderly household members influences the well-being of their households, aside from the influence of other age groups, after controlling for other factors (demographic, economic, and non-economic). Additionally, the results of this research are expected to contribute valuable insights into the government's efforts to build a prosperous, healthy, and dignified elderly generation.

RESEARCH METHODS

The data used in this study is derived from the National Socio-economic Survey (Susenas) conducted in March 2019. The unit of analysis under investigation is households with members aged 60 and above (elderly households), totaling 86,927 households. The choice of the 2019 data is due to this period not being influenced by the COVID-19 pandemic, as global economies were estimated to have been affected since the end of 2019. Indonesia, in particular, recorded a decline in household consumption expenditure in the first quarter of 2020, showing a deeper trend compared to the two previous years (Badan Pusat Statistik, 2020a).

This research employs a quantitative approach with descriptive and multiple regression analyses, specifically Ordinary Least Square (OLS). The OLS method is utilized to establish a systematic relationship among various demographic, economic, and non-economic factors with factors related to household well-being, as seen in several studies conducted by Gounder (2012), Wuryandari (2015), Puspita and Agustina (2019), Han and Cheng (2020). In the technical notes of the Stata application manual, if the aim of estimation is directed towards the average of a dependent variable in a specific subsample (in this research, households inhabited by the elderly), the use of OLS can effectively explain the relationship between dependent and independent variables (Stata.com, no date). The number of household members is categorized into three age groups, similar to the approach used in the study by Han & Cheng (2020), with adjustments to the criteria for the elderly group in accordance with Law No. 13/1998 concerning the Welfare of the Elderly.

The OLS method is followed by testing for normality, homoscedasticity, autocorrelation, and multicollinearity to ensure reliable hypothesis testing. The central limit theorem assumption is applied when testing a large sample size ($n > 30$). Robust standard errors are employed if heteroscedasticity issues are identified in the model. Using robust standard errors will not alter the coefficient estimation results from OLS. However, it may lead to differences in standard error values (typically larger), test-statistic (t-stat) values, and P-values. Moreover, the significance level of independent variables and R-squared values also have the potential to change. Following the OLS analysis with robust standard errors, these altered values are examined to determine whether there is an increase. An increase in R-squared or the significance level of independent variables indicates that OLS with robust standard errors provides a more reliable regression for hypothesis testing compared to regular OLS.

Based on the theoretical review and literature studies mentioned earlier, the hypothesis in this research is that the number of

elderly individuals in a household is significantly related to the well-being ratio of elderly households. The regression model to estimate the well-being ratio in elderly households is as follows:

$$WelfareRatio_i = \beta_0 + \beta_1 N\_Old_i + \beta_2 N\_Adult_i + \beta_3 N\_Child_i + \beta_4 lnIncome_i + \beta_5 Age\_KRT_i + \beta_6 AgeSq\_KRT_i + \beta_7 Sex\_KRT_i + \beta_8 Edu\_KRT_i + \beta_9 WorkHead_i + \beta_{10} House_i + \beta_{11} Location_i + \beta_{12} Region_i + \beta_{13} HealthOpt_i + u_i \dots\dots\dots\dots\ (1)$$

$WelfareRatio_i$ is the well-being ratio of the elderly household i; N_Old_i is the number of elderly members in household i; N_Adult_i is the number of adult members in household; N_Child_i is the number of child members in household; $lnIncome_i$ is the natural logarithm of the household income $\underline{i}$ approximated by the total household expenditures; Age_KRT_i is the age of the head of household i; $AgeSq\_KRT_i$ is the squared age of the head of household i; Sex_KRT_i is the gender of the head of household i; Edu_KRT_i is the number of years of education of the head of household i; $WorkHead_i$ is the employment status of the head of household i; $House_i$ is the homeownership status of the household i; $Location_i$ is the location of the household i; $Region_i$ is the region of the household i; $HealthOpt_i$ is the effort to utilize health access by the household optimally i; u_i is the residual variable. Further details are explained in Table 1.

Table 1. Operational Definition of Research Variables

Variable	Definition, Scale, and References
WelfareRatio	The cost of consumption expenditure per household member is divided by the minimum dollar amount to meet the minimum basic food needs, equivalent to 2100 kilocalories per capita per day, and basic non-food needs monthly. Numeric, in decimal numbers. GK BPS 2019 IDR 425,250/capita/ month (World Bank, 2019)
N_Old	Number of household members aged 60 years and above. Numeric, people. (Han and Cheng, 2020)
N_Adult	Number of household members aged 15 - 59 years. Numeric, people. (Han and Cheng, 2020)
N_Child	Number of household members aged 0 - 14 years. Numeric, people. (Han and Cheng, 2020)
Income	The amount of revenue households spend on household consumption expenditure per month, proxied by the total household expenditure per month. Numeric, in rupiah per month. (Rufino, 2016; Illahi, Adry and Triani, 2018; Puspita and Agustina, 2019)
Age_KRT	Age of the household member who is responsible or considered/appointed as the head of the household. Numeric, year. (Gounder, 2012; Wuryandari, 2015; Lekobane and Seleka, 2017; Maniriho *et al.*, 2021)
AgeSq_KRT	The age of the household head was squared to accommodate the nonlinear relationship between age and expenditure. Numeric, year squared. (Gounder, 2012; Wuryandari, 2015; Lekobane and Seleka, 2017)
Sex_KRT	Gender of the household head. 0 = Female (ref)

Variable	Definition, Scale, and References
	1 = Male
	(Wuryandari, 2015; Lekobane and Seleka, 2017; Maniriho *et al.*, 2021)
Edu_KRT	Years of education correspond to the last grade of education attained by the household head.
	Numeric, year.
	(Gounder, 2012; Lekobane and Seleka, 2017; Maniriho *et al.*, 2021)
WorkHead	The activity status of the household head during the past week, whether working or not.
	0 = Not working (ref)
	1 = Working
	(Wuryandari, 2015; Lekobane and Seleka, 2017; Astuti, 2018)
House	The ownership status of the occupied residential building is either owned or not owned.
	0 = Not self-owned (ref)
	1 = Owned
	(Gounder, 2012; Wuryandari, 2015; Maniriho *et al.*, 2021)
Location	The location where the household is located is either Rural or Urban.
	0 = Rural (ref)
	1 = Urban
	(Gounder, 2012; Wuryandari, 2015; Lekobane and Seleka, 2017; Puspita and Agustina, 2019; Maniriho *et al.*, 2021)
Region	The region where the household is located is categorized as Java and Bali and outside Java and Bali.
	0 = outside Java and Bali (ref)
	1 = Java and Bali
	(Gounder, 2012; Wuryandari, 2015; Rufino, 2016)
HealthOpt	Household awareness of optimizing health access or facilities for preventive healthcare is observed from early age to old age. This is indicated by indicators such as health insurance, health insurance for health check-ups, households with toddlers ensuring immunization, households with women who have given birth having the birthing process assisted by trained healthcare personnel, and practicing family planning (modern or traditional methods).
	0 = Not/yet making optimal efforts to utilize health access/facilities for prevention/preventive (ref)
	1 = Optimal in utilizing existing health access/facilities for preventive actions.
	(Christensen *et al.*, 2009)

Source: Data Processed, 2023

RESULTS AND DISCUSSION

Descriptive statistics for the elderly household under study, as shown in Table 2, indicate that the average well-being ratio of elderly households is 2.639, with a relatively high standard deviation (indicating significant variability in well-being ratios). The average data for the number of household members per age group shows 1 elderly person, 2 adults, and 1 child in one household. The average age of the head of the elderly household is 63 years, with an average education duration of 6.5 years. Male gender predominates as the head of the elderly household, and most household heads are employed. Most elderly households own their homes.

The location of elderly households is mostly in rural areas, and their regions are outside the Java and Bali regions. Concerning health optimization, most elderly household members have not optimally utilized health access/facilities for preventive health needs.

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.
The welfare ratio of elderly households	2,639	2,497
Number of elderly household members	1,288	0,470
Number of adult household members	1,699	1,420
Number of child household members	0,684	1,013
Ln household income	14,831	0,757
Age of household head	62,980	11,962
Age of household head squared	4.109,538	1.415,989
Sex of household head	0,744	0,437
Years of education of the household head	6,457	4,305
Working status of household head	0,695	0,460
Homeownership status	0,924	0,264
Location	0,410	0,492
Region	0,387	0,487
Optimisation of health by household members	0,236	0,425
N	86.927	

Source: Data Processed, 2023

Based on the national poverty line in 2019, it is known that almost one-third of the total elderly households (ruta lansia) under study fall into the categories of poor and vulnerable (see Table 3). Meanwhile, most other elderly households fall into the aspiring middle-class category. The remaining, almost one-fifth, fall into the middle-class category, with only 0.36 percent classified as upper class.

Table 3. Distribution of Elderly Households by Welfare Group

Household Welfare Group	Percent
Poor	12,57
Vulnerable	19,99
Aspiring Middle Class	47,09
Middle Class	19,98
Upper Class	0,36
Total	100,00

Source: Data Processed, 2023

The development to realize an advanced, prosperous, and socially just Indonesia for all its people continues inclusively and sustainably. The elderly, as part of Indonesia's population, are not just the object of development but also its subjects. Therefore, the growing number of elderly individuals in Indonesia is indispensable in driving the nation's progress. The elderly population and other age groups contribute collaboratively to achieve the development goals, aiming to make Indonesia an advanced country by 2045. A high-quality population in terms of education, health, and the economy is the best resource for implementing development and achieving the goals of Indonesia Emas 2045.

The significant number of elderly people living in poverty and vulnerability in Indonesia has the potential to be one of the hindering factors in the efforts to achieve Indonesia Emas 2045. Meanwhile, most other elderly individuals in the aspiring middle-class category have the potential to drive development. However, on the other hand, they can also become obstacles if the

direction and development approach are not accurate and careful. The increase in the number of elderly individuals, only in terms of quantity and not accompanied by improvements in education, health, and the economy, can burden the productive population, hindering economic growth and development. Hindered economic growth will make it difficult for Indonesia to escape the Middle-Income Trap (MIT), impacting the unattainability of Indonesia Emas 2045.

Indonesia is approaching its future development through three transformative aspects: economic transformation, social transformation, and governance transformation. Efforts are being made to lift Indonesia out of the Middle-Income Trap (MIT), which involves economic transformation by promoting an increase in Indonesia's economic growth. An average of seven percent economic growth is required for Indonesia to escape the MIT by 2038. If the average economic growth reaches only six percent, Indonesia will escape the MIT around 2041. Indonesia's economic growth is only about five percent (Coordinating Ministry for Economic Affairs of Indonesia, 2023), coupled with the country entering the aging population phase in 2021. Indonesia's economic growth must be enhanced from its current state, considering the challenges of increasing human resource productivity amid the growing elderly population. Productivity, as a crucial factor in development mentioned in both Neo-Classical Economic Growth Theory and Endogenous Economic Growth Theory (Juhro and Trisnanto, 2018), must be increased for the economic growth rate to continue growing optimally.

The number of working elderly individuals continues to rise. In 2017, 47.92 percent of the elderly were still working, increasing to 49.39 percent in 2019 and rising to 52.55 percent in 2022. The types of jobs the elderly hold are generally vulnerable to economic fluctuations. If the economy worsens, elderly workers are expected to be most adversely affected (Badan Pusat Statistik, 2022). The need to meet household expenses compelsed many elderly individuals to continue working in their later years.

The elderly household that depends on the income of working household members reached 82.99 percent in 2022. Meanwhile, the elderly who depend on investments and pensions constitute only 5.63 percent. The low savings and investments for the elderly in Indonesia will have a negative impact on economic growth, as Harrod and Domar's theory concludes (Juhro and Trisnanto, 2018).

The results of the OLS regression indicate that overall, the independent variables significantly influence the estimated dependent variable in the regression model at a 1 percent significance level. This is evident from the F-statistic test result (overall test) of 10,690.26, indicating that the model has a Prob > F value smaller than $\alpha=1$ percent (0.00 < 0.01). Furthermore, based on the R-squared value, the OLS regression model, as a whole, can explain 61.52 percent of the variation in the welfare ratio of elderly route members, while factors outside the model explain the remaining percentage. The regression results also show that the number of elderly route members negatively correlates with the household welfare ratio. This value is the highest compared to other independent variables, negatively affecting the household welfare ratio. The number of route members in the elderly route (elderly, adult, and child) each negatively correlates with the household welfare ratio.

Table 4. OLS Estimation Results

Variable	Coef. (Std. Err.)	T-stat
Number of elderly household members	-0,8969984*** (0,0129188)	-69,43
Number of adult household members	-0,8804601*** (0,0049902)	-176,44
Number of child household members	-0,5564554***	-92,47

Variable	Coef. (Std. Err.)	T-stat
Ln household income	(0,0060176) 2,926409*** (0,0096198)	304,21
Age of household head	0,0057022* (0,0029507)	1,93
Age of head of household squared	0,0000649*** (0,000025)	2,6
Sex of household head	-0,3275458*** (0,0141694)	-23,12
Years of education of the household head	0,0250124*** (0,0015025)	16,65
Working status of household head	0,0090356 (0,0130076)	0,69
Homeownership status	0,0132911 (0,0201892)	0,66
Location	0,0671252*** (0,0119443)	5,62
Region	0,1996357*** (0,0112706)	17,71
Optimisation of health by household members	0,0369197*** (0,0127794)	2,89
Cons	-38,40618*** (0,1519989)	-252,67

Note: *** p<0,01; ** p<0,05; * p<0,1
Source: Data Processed, 2023

In addition to the variable of the number of household members per age group, which is negatively associated with the welfare ratio, the variable of the head of the household's gender is also negatively related to the welfare ratio. Meanwhile, other independent variables have a positive relationship with the welfare ratio. The income variable is the one with the largest positive coefficient relationship with the welfare ratio, followed sequentially by the positive values of the variables: region, location, health optimization, the length of the head of the household's education, homeownership, the employment status of the head of the household, the age of the head of the household, and the squared age of the head of the household.

There are classical assumptions that must be satisfied for Ordinary Least Squares (OLS) estimation to be Best Linear Unbiased Estimate (BLUE), namely, the data (residual values) should be normally distributed or approach normal distribution, the model should be homoskedastic (variance of each residual component remains constant and not heteroskedastic), there should be no autocorrelation (relationship between residual components), and it should be free from perfect multicollinearity among independent variables. The first test of classical assumptions, the normality test on the residual values of the OLS regression model using the Shapiro-Wilk test, yields a significance value (Prob>z) smaller than 0.05. These results indicate that the data does not meet the normality assumption. However, the large number of observations (n>30) allows the normality assumption to be ignored, and the Central Limit Theorem assumption is used (Gujarati, 2004).

Table 5. Shapiro-Wilk Normality Test Results

Variable	Obs	W	V	z	Prob>z
Resid	86.927	0,48301	14.000	26,768	0,00000

Source: Data Processed, 2023

The following assumption tested is the homoskedasticity of the model. The test results using the Stata application (Breusch–Pagan/Cook–Weisberg test) yield a probability value of the chi-square statistic (Prob>chi2) smaller than α (0.00<0.01). This indicates that the model is heteroskedastic, so it is necessary to use robust standard errors to address the issue of heteroskedasticity.

Table 6. Homoscedasticity Model Test Results

Breusch–Pagan/Cook–Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of WelfareRatio
H0: Constant variance
chi2(1) = 366679,65
Prob > chi2 =   0,0000

Source: Data Processed, 2023

Testing the assumption of freedom from autocorrelation in cross-sectional data was not conducted because autocorrelation involves the correlation between residual components of observation results arranged in different times or spaces. The March 2019 Susenas data is one-time, so autocorrelation testing was not performed.

Table 7. Multicollinearity Test Results

Variables	VIF	1/VIF
AgeSq_KRT	45,36	0,022047
Age_KRT	45,14	0,022152
LnIncome	1,92	0,520019
N_Adult	1,82	0,549686
Edu_KRT	1,52	0,65953
Sex_KRT	1,39	0,72085
N_Child	1,35	0,743181
N_Old	1,34	0,748177
WorkHead	1,3	0,76953
Location	1,25	0,799645
Region	1,09	0,915943
HealthOpt	1,07	0,936601
House	1,03	0,968568
Mean VIF	8,12	

Source: Data Processed, 2023

Next is the testing of the assumption of independence from multicollinearity, which is done by examining the Variance Inflation Factor (VIF) values, the results of which are presented in Table 6. Based on the testing, an average VIF value of 8.12 indicates no multicollinearity issues in the model (multicollinearity problems are detected if VIF > 10). Meanwhile, the VIF values for the variables of the household head's age and the household head's squared age are large because the squared age variable is the squaring of the age of the household head to analyze the nonlinear effect of age.

Based on the classical assumption test on the OLS regression model of household welfare ratio, it is found that the regression model has heteroskedasticity issues. Therefore, the regression model calculations need to use Huber-White robust or robust standard errors. Using robust standard errors will provide more accurate standard error values for the calculated regression coefficients, thereby strengthening the determination of whether an independent variable is statistically significant or providing a more reliable hypothesis test.

Table 8. OLS Estimation Results with Robust Standard Errors

Variables	Coef. (Robust Std. Err.)	t-stat
Number of elderly household members	-0,8969984*** (0,0152896)	-58,67
Number of adult household members	-0,8804601*** (0,0109243)	-80,6
Number of child household members	-0,5564554*** (0,0073839)	-75,36
Ln household income	2,926409*** (0,0333564)	87,73
Age of household head	0,0057022** (0,002683)	2,13
Age of household head squared	0,0000649*** (0,0000239)	2,72
Sex of household head	-0,3275458*** (0,0161011)	-20,34

Variables	Coef. (Robust Std. Err.)	t-stat
Years of education of the household head	0,0250124*** (0,0016898)	14,8
Working status of household head	0,0090356 (0,0147153)	0,61
House ownership status	0,0132911 (0,0197012)	0,67
Location	0,0671252*** (0,0100373)	6,69
Region	0,1996357*** (0,0139771)	14,28
Optimisation of health by household members	0,0369197*** (0,0133516)	2,77
Cons	-38,40618*** (0,4567607)	-84,08

Note: *** p<0,01; ** p<0,05; * p<0,1

Source: Data Processed, 2023

The use of robust standard errors does not change the estimated coefficients from the OLS regression model for all independent variables in the model, as presented in Table 8. However, all standard error values for each coefficient of the independent variables have changed. The robust standard error values for nine coefficients, namely the number of elderly household members, the number of adult household members, the number of child household members, ln household income, the gender of the household head, the years of education of the household head, the employment status of the household head, the region, and health optimization, are greater than the normal standard error values. On the contrary, the robust standard error values for the coefficients of the age of the household head, the squared age of the household head, the homeownership status, and the location are smaller than the normal standard error values. Using robust standard errors generally results in larger values than normal standard errors, but there is still a possibility of producing smaller standard error values (Zach, 2020).

In addition to the changing standard error values, the values of all t-statistics also change, which can certainly affect the significance level of each independent variable in influencing the variable of household welfare ratio. The p-values of the variables age of the household head, squared age of the household head, employment status of the household head, homeownership status, and health optimization have changed. The variable age of the household head, which previously had a significant relationship with the welfare ratio at the 10 percent level in the ordinary OLS regression model, becomes significantly related at the 5 percent level in the OLS regression model with robust standard errors. Meanwhile, the other four variables that also experience changes in p-values do not change the significance level. Furthermore, the R-squared values of the OLS regression model with robust standard errors are the same as those of the ordinary OLS regression model, both at 61.52 percent. Based on this analysis, the OLS model with robust standard errors is considered more reliable than the ordinary OLS model for hypothesis testing in the research. The regression results of this model can be expressed in the following equation:

$$WelfareRatio_i = -38,406 - 0,897\ N\_Old_i - 0,8805\ N\_Adult_i - 0,5565\ N\_Child_i + 2,9264\ lnIncome_i + 0,0057\ Age\_KRT_i + 0,0001\ AgeSq\_KRT_i - 0,3275\ Sex\_KRT_i + 0,025\ Edu\_KRT_i + 0,009\ WorkHead_i + 0,0133\ House_i + 0,0671\ Location_i + 0,1996\ Region_i + 0,0369\ HealthOpt_i + u_i\ ...(2)$$

The results of the OLS regression with robust standard errors indicate that all variables related to the number of elderly members in the household significantly correlate with a decrease in the welfare ratio of the elderly household. The number of elderly individuals in the household significantly correlates with a decrease in the household's welfare. Each additional elderly person will decrease the welfare ratio of the household by 0.897 units. This suggests that having one elderly person in the household is associated with lower per capita household expenditures by Rp381,449/month (referring to the value from BPS in 2019, which is Rp425,250 per capita/month). This value is higher than the impact of having one additional adult, which is only associated with lower per capita expenditures of Rp374,416/month.

Meanwhile, having one child only lowers per capita household expenditures by Rp236,633/month. It can be observed that the influence of the number of adult members in reducing household welfare is slightly smaller than that of the elderly. The number of child members has the most negligible impact on reducing the welfare ratio of the elderly household compared to the other two age groups. Other significant variables positively correlated with the welfare ratio, in descending order of their impact, include household income, region, location, health access optimization, the duration of the household head's education, and the age of the household head. While male household heads significantly correlate with lower welfare ratios than female household heads. Only the employment status of the household head and homeownership status do not significantly correlate with the dependent variable.

The U-shape test results for the variables of the household head's age and the household head's squared age yield an extreme point of -43.91489. The test results also accept the null hypothesis (H0) that the independent variables are related to the dependent variable in a monotonic or inverse U-shape (refer to Table 9). These findings indicate that the age variable has an inverted U-shaped relationship with the welfare ratio variable of the elderly household.

Table 9. Results of the U-shape test for the Age of the Household Head variable and the Squared Age of the Household Head variable

Spesification: f(x)=x^2	
Extreme point: -43,91489	
Test:	
H1: U shape	
vs H0: Monotone or Inverse U shape	
	Lower bound	**Upper bound**
11	97
0,0071306	0,0182975
Extremum outside interval – trivial failure to reject H0	

Source: Data Processed, 2023

Members of the elderly age group in the household and other independent variables significantly correlated with substantial changes in the welfare ratio of elderly routes. The overall F-statistic test result of 1,525.53 indicates that the model has a Prob > F value smaller than α=1 percent (0.00<0.01). Overall, independent variables influence the dependent variable. Additionally, it is known partially that the variables such as the number of elderly members in the household, adult age, child age, the natural logarithm of household income, squared age of the household head, gender of the household head, years of education of the household head, household location, regional placement, and household awareness to make optimal use of health access for preventive health actions significantly correlate with significant changes in the welfare ratio of elderly routes at a 1 percent significance level. Meanwhile, the age of the household head variable correlates significantly at a 5 percent significance level. In contrast, the working status of the household head and homeownership status do not have a significant correlation. Based on the adjusted R-squared value from the OLS regression model with robust standard error, the estimation model can explain 61.52 percent of the variation in the welfare ratio of elderly routes overall, while other factors outside the regression model explain the rest.

Based on the analysis of OLS with robust standard error, it can be explained that the number of elderly individuals in elderly routes in Indonesia significantly has the most significant impact in reducing the welfare ratio of their households compared to household members in other age groups with the same number. In other words, with the same number, the elderly impose a greater burden on the economic capacity of elderly family households than adults and children. The greater the number of elderly individuals in Indonesia, the more it will decrease the household's ability to meet the minimum needs for food and non-food items every month (reducing the household budget constraint). If related to Consumer Choice Theory, the findings of this research indicate that in 2019, the presence of the elderly in households,

compared to the presence of adults or children, will result in a lower level of satisfaction for each member of the elderly route in meeting the household needs according to the preferences of each route member. This lower level of satisfaction is likely related to the increased potential for discrimination or even violence against the elderly by other route members. Social welfare spending implemented by the government for the elderly and their families can help address the satisfaction issues of meeting the needs of the elderly routes if it is targeted and in the right amount. Meanwhile, whether the preferences of the elderly's needs compared to those of adult or child route members are related to the welfare of elderly routes, such as the number of route members, requires further research beyond this study.

The number of adult route members also impacts the household welfare ratio in the same direction as the number of elderly members, and its effect is only slightly smaller than the number of elderly members. However, adult route members are a productive group that generally serves as the main income earners for the household, unlike the elderly group, which statistically, in 2019, was known to have 46.22 percent with income less than IDR 1 million per month (Badan Pusat Statistik, 2019). The low productivity of the elderly is also related to low levels of education and health. This is reflected in the average length of schooling for the elderly in 2019, which was only 4.98 years (equivalent to the fourth grade of elementary school). 51.08 percent of the elderly experienced health complaints, and 26.2 percent suffered from illnesses (Badan Pusat Statistik, 2019). The significant impact of the presence of the elderly on this welfare ratio can be understood because as individuals age, productivity decreases, physical and psychological problems increase, and they tend to become more dependent on other, more productive, household members, such as children and grandchildren (Hoi, Thang and Lindholm, 2011; Kidd *et al.*, 2018; Badan Pusat Statistik, 2020b). As someone ages, their ability to work and earn income will become more limited, in line with the Life Cycle

Consumption Model Theory, where an individual's earning capacity will continuously decline after reaching its peak at a certain age (ideally approaching retirement or around the age of 50). The reduced contribution of the elderly population to the total household income will decrease household expenditures (reducing the household budget constraint). This is as expressed by Song and Zhang (2018).

The overall decrease in population productivity due to the increasing number of elderly individuals can negatively affect Indonesia's economic development. Household expenditures play a crucial role in Indonesia's economic growth. The combination of low spending by elderly route members and their increasing numbers due to the aging population can hinder optimal economic growth. If the savings and investments accumulated by the elderly can meet their needs in old age, following the Life Cycle Consumption Model Theory, the needs of the elderly will not impose an overly burdensome load on meeting the household's needs compared to the burden from younger or adult route members. The savings and investments the elderly hold can drive economic growth, as per the Harrod-Domar Economic Growth Theory in Juhro and Trisnanto (2018).

The coefficients' results for the number of elderly, adults, and children in households show a negative correlation, indicating that every age group contributes to the decline in the well-being of elderly route members. Increasing the number of household members will reduce the needs that can be met with limited household income. These findings align with previous research (Lanjouw and Ravallion, 1995; Gounder, 2012; Maniriho *et al.*, 2021). Consequently, per capita expenditures and the household well-being ratio will decrease. When related to household size, a smaller size for the elderly route leads to a lighter household burden. This condition makes the well-being ratio of smaller elderly routes larger compared to larger ones. This situation corresponds to a common phenomenon observed in many countries today, where household sizes are decreasing (Kirk, 1996; Bongaarts, 2001; United Nations Population Division, 2017;

Agree, 2018). The negative impact of all age groups in the route on the household well-being ratio could be a scientific basis for the observed trend of decreasing household sizes. This is likely closely related to the potential increase in the neglect of the elderly, which can become a socio-economic issue for Indonesia in its future development efforts.

The total income of the elderly route used to finance household needs significantly correlates positively with the household well-being ratio. Every 10 percent increase in the total income of the elderly route can raise the household well-being ratio by 0.293 units. The increase in total income will enhance the ability to meet household members' needs evenly (an increased budget constraint), leading to a corresponding increase in the household well-being ratio. This factor explains the phenomenon of many elderly individuals choosing to continue working in their later years. The elderly can continue contributing to their household income if they still have opportunities to be employed in fields suitable for their skills. This finding aligns with the ongoing trend of an increasing number of elderly individuals staying in the workforce.

The Neo-Classical Economic Theory explains that the amount of capital resources, the increasing labor force, and the level of technological development support the magnitude of a country's economic growth. The ongoing demographic transformation in Indonesia will lead to continuous growth in the elderly workforce. For optimal economic growth, all resources used for production, namely capital and labor, must be utilized at full employment levels. Therefore, the more productive elderly individuals are absorbed into the workforce, the better economic growth is achievable. This is driven by the increased contribution of the elderly to their household income.

Furthermore, the optimization of the workforce is also supported by the Endogenous Economic Growth Theory. The quality of the workforce, including both the productive age group and the elderly, needs to be improved. Strengthening human resources is one of the factors that must be considered to promote

Indonesia's economic growth, alongside creating new economic growth and technological development (Juhro and Trisnanto, 2018). Based on this analysis, the changing dynamics of the population become crucial for periodic examination by countries experiencing a growing elderly population. The elderly and the adult population become a crucial factor supporting productivity in economic development.

The older head of the household in elderly routes in Indonesia is significantly associated with a higher well-being ratio. This result aligns with Gounder's (2012) study in Fiji. The increasing age of the head of the household leads to better well-being ratios as income rises due to career advancement or increased asset accumulation. However, according to the life cycle consumption theory, this will reach a turning point where, at a certain age, declining productivity leads to a decrease in income. Factors such as increased competition in the job market as age advances or a reduction in assets due to the needs of older or younger family members that cannot be met by existing income contribute to this decline. The positive and significant coefficient of the squared age of the head of the household indicates this. Using the curve fit command in Stata, it is revealed that the curve estimating the relationship between the well-being ratio of the household and the age of the head of the household moves upward and then slowly declines again. Based on the U-shape test in Stata, it is estimated that the curve describing the relationship between the well-being ratio of the household and the age of the head of the household approximates an inverse U-shape, with an estimated turning point/saddle point at the age of 43.91 years. This indicates the average highest well-being ratio achieved by elderly routes. Unfortunately, this condition is not ideally aligned with the Life Cycle Consumption Model Theory, where the average well-being ratio should reach its highest point when approaching retirement age, around 50.

The male head of the household is significantly associated with a lower well-being ratio of elderly routes by 0.327 units than routes led by females. It should be noted that, on

average, the size of elderly routes led by male heads of households is larger than those led by female heads. This indicates that the larger average size of elderly routes with male heads of households, compared to those led by females, leads to lower per capita expenditures and ultimately results in a lower well-being ratio. Ts is also indicated to be related to women's better economic management abilities, as revealed by Pangaribowo, Tsegai, and Sukamdi (2019).

In terms of education, the longer the education pursued by the head of the household, the more significantly it correlates with the increase in the well-being ratio of the household. An additional year of education is associated with a higher well-being ratio of 0.025 units. This result aligns with a study conducted by Arsani, Ario, and Ramadhan (2020), where individuals who can attain higher education significantly impact the better well-being of their households compared to those with only secondary education, especially those with only primary education. Furthermore, higher levels of education are associated with a reduced likelihood of households becoming impoverished (Wuryandari, 2015; Astuti, 2018). Other study findings indicate that the expenditure level generally increases with better education (Becker and Murphy, 2007; Gounder, 2012; Maniriho *et al.*, 2021). The higher the expenditure level, the better it is for the economy, and this is a condition desired through development in education.

Elderly households in urban areas and the Java and Bali regions are significantly indicated to have a higher well-being ratio than those in rural areas and outside Java and Bali (there are disparities between locations and regions). This aligns with the conclusion of Wuryandari (2015) where locations or regions that are more developed or economically advanced are related to better well-being. Furthermore, elderly households are aware of making efforts to utilize health access optimally and have a better well-being ratio. If household members maintain health from an early age, it will reduce the risk of disabilities or illnesses that can decrease their productivity (Christensen *et al.*, 2009). Maintaining the productivity level of household

members will lead to better income levels, contributing to household well-being. The employment status of the head of the household and homeownership do not correlate significantly with the well-being ratio of the household. However, the direction is in line with the estimates, where households with a working head and homeownership indicate having a better well-being ratio.

Based on the analysis, the number of elderly individuals in households is associated with the lower well-being of elderly routes in Indonesia, together with the number of adults and children. An increase in the number of elderly members in the elderly route will reduce the satisfaction level in meeting household needs due to lower budget constraints. The declining elderly productivity is related to the decrease in the budget constraints of the elderly route because of the decrease in the elderly's contribution to the total household income. The condition of the elderly related to the decline in household well-being needs to be considered in policy determination. The negative impact of the number of elderly individuals on their household's well-being, as found in this study, should not increase in the future along with Indonesia's economic development reaching advanced status and the changing structure of Indonesia's population becoming an aging population. Therefore, development policies that encourage elderly productivity to remain optimal and contribute adequately to their family's economy are needed. The government cannot focus solely on improving the human resources of children and adults but must also consider the elderly. The elderly cannot just be objects in development but must also be active subjects in sustainable development and other age groups.

Changes in the proportion of the elderly, adults, and children from year to year will generate the potential for a demographic bonus that can be utilized as a driver for high and sustainable economic growth. During the first demographic bonus, the benefits are temporary as they only occur within a specific timeframe, followed by challenges related to the increasing proportion of the elderly. Suppose the growing

elderly population is economically prepared to experience their old age in a quality manner. The quality of the elderly's conditions represents the second demographic bonus that has the potential to provide permanent benefits for economic development (Mason in Maliki, 2010). Indonesia must be able to maximize both of these demographic bonuses. The continuously increasing elderly population is crucial for achieving Indonesia Emas 2045 (Golden Indonesia 2045). Improving the well-being of the elderly is indispensable to transforming them into assets for development. The elderly require social and economic support to lead a quality life. Therefore, developing the quality of life for the elderly needs to be continually pursued in accordance with the changing demographic conditions and other dynamic challenges.

Efforts to improve the well-being of the elderly can be undertaken through enhanced education, health optimization, and economic empowerment to help maintain their productivity. Economic development must consider providing suitable employment opportunities with adequate wages for the elderly. If productivity is sustained with sufficient job opportunities, it is expected that the elderly can continue to contribute adequate income to their households until retirement age. This will alleviate the economic burden of having the elderly in households. Reducing the economic burden on households will positively impact improving the well-being of the elderly population in Indonesia. This positive influence will drive Indonesia's overall economic growth and contribute to achieving Indonesia Emas 2045 (Golden Indonesia 2045). Economic development in rural areas must also be accelerated to match urban areas. Similarly, economic development outside the regions of Java and Bali should be promoted to avoid disparities in the well-being of the elderly across different locations and regions.

CONCLUSION

This research indicates that the total number of household members in each age group within the elderly household route significantly correlates with lower household well-being. The number of members in the elderly household route has the most significant impact on the lower well-being ratio of elderly households compared to members in the adult and child routes. As individuals age, their ability to work and earn income diminishes, reducing their contribution to the total household income and consequently affecting the decline in household well-being. Meanwhile, factors such as household income, households located in economically prosperous regions, urban locations, optimization of healthcare access by route members, the length of the head of the route's education, and the age of the head of the route are significant factors associated with a higher level of well-being in the elderly household route. The age of 43.91 years is estimated to be the turning point/saddle point of the head of the route's age, indicating the average highest well-being ratio commonly achieved by the elderly route. Additionally, a significant correlation is observed, with male heads of the route associated with a lower well-being ratio than female heads. Although not significantly influential, households with working heads of the route who own their own homes have a positive association with household well-being ratios.

Based on these findings, the government needs to prioritize the elderly routes of the poor and vulnerable groups, which have the highest number of elderly members and include members of child age, in targeting various social welfare expenditures for the elderly and their families. Before entering the pre-elderly age group of 45-59, the adult population should be encouraged to plan for their old age when the well-being conditions of their households are still on an upward trajectory. Policies in education, health, and the economy should not neglect the interests of the elderly but focus on the young and productive age group. Fair and equitable policies are needed to maintain the population's productivity in Indonesia's economic development. The government also needs to address economic development disparities between rural and urban areas and among regions. Further research on the same topic could

use demographic, economic, non-economic, and even geospatial factors not utilized in this study to generate more specific and accurate analyses.

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