

Aging Yet Thriving: The Role of Silver-Entrepreneurship in Driving Regional Economic Growth

Ulya Faiza Husna^{1*}, Dwi Prasetyani¹

Affiliation ¹Universitas Sebelas Maret

Email ulyafaiza@student.uns.ac.id*

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ABSTRACT

This study examines the influence of silver-entrepreneurship on economic growth in 34 provinces in Indonesia from 2020 to 2024. The influence was analyzed using panel data regression with the Fixed Effect Model Generalized Least Square (FEM-GLS) method. The results show that elderly who remain productive through entrepreneurship do not become an economic burden but contribute positively to regional economic growth. However, the increase in businesses involving paid workers in small-scale enterprises with low productivity tends to weaken growth due to low value-added production. These findings highlight the need for the government to support productive silver-entrepreneurs, for example, by providing business development loans for the elderly to help them run and expand their businesses. Additionally, local governments can implement mentoring programs for the elderly to identify business opportunities, increase worker productivity, and encourage business expansion.

Keywords: Elderly Population, Silver Entrepreneurship, Economic Growth, Aging Population

JEL Classification: L26, O47, J14

INTRODUCTION

As the demographic bonus progresses, the population of productive age will shift toward non-productive age, leading to the phenomenon of population aging, often referred to as an aging population, where the number of elderly increases. Based on Article 1 of the Republic of Indonesia Law Number 13 of 1998, a person can be considered elderly if they have reached the age of 60 years or older. This research was conducted in Indonesia, so the author used the basis of that law, which defines the elderly as someone aged 60 years and over.

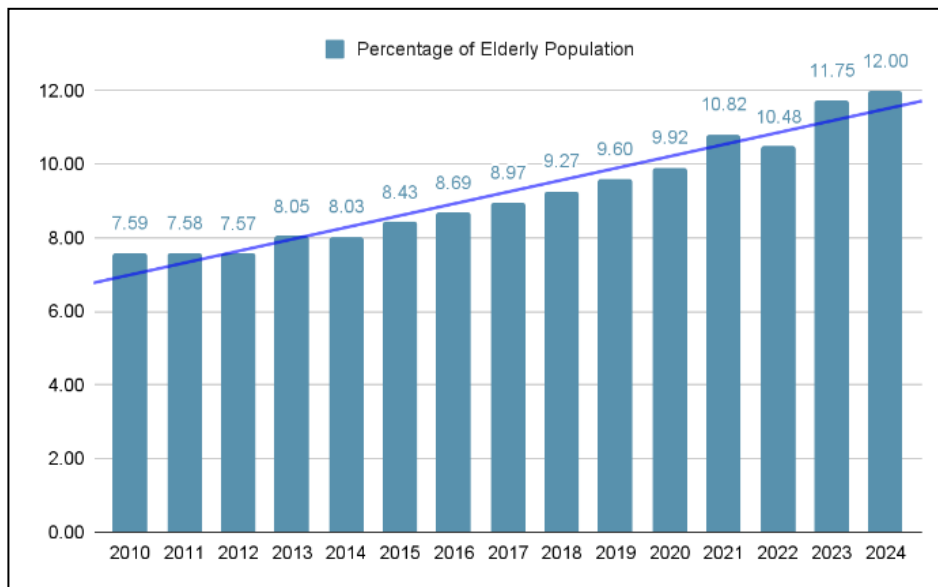


Figure 1. Proportion of Elderly Population in Indonesia 2010-2024

Source: BPS, *Statistik Penduduk Lanjut Usia* (2024)

A region is considered to have an aging population structure when the percentage of elderly in that region reaches 10 percent or more (Adioetomo, 2020). Based on this opinion, Figure 1 shows that Indonesia has currently entered an aging population structure. As many as 21 provinces in Indonesia have reached a percentage of elderly population above 10 percent (BPS, 2024). This indicates that more than half of the total provinces in Indonesia have reached the population aging phase. Thus, the role of the elderly in this phenomenon becomes relevant to discuss.

In sustainable development, the realization of human rights for all people, including the elderly, is a primary goal. The 2030 Agenda for Sustainable Development (United Nations, 2017) focuses on building an older society as a form of preparation for the aging population, which can impact favorable health goals, poverty eradication, economic growth and decent work, gender equality, inequality reduction, and sustainable cities. Population aging presents significant opportunities for sustainable development related to the active participation of older generations in the economy, the labor market, and society at large. Therefore, aging and the elderly are important to discuss for development, which is why the author conducted this research, specifically to determine the role of the elderly in economic growth in Indonesia.

Population aging can be a challenge for a country. Thanh Trong et al. (2024) states that one of the main impacts of population aging is the increasing elderly dependency ratio, which is the ratio of the number of people aged 65 and over to the number of people aged 15-59 (productive). Their research, conducted in ASEAN countries, found that the elderly dependency ratio negatively affects economic growth. This means that an increase in the dependency ratio of the elderly on the productive population leads to a decline in economic growth in that country. Research by Maestas et al. (2016) in the United States estimated that population aging reduces per capita GDP growth. Specifically, a 10 percent increase in the elderly population (aged 60 and over) lowers per capita GDP growth by 5.5 percent. This is because the growth of labor productivity and per capita employment slows down.

However, population aging has the potential to generate a second demographic dividend, which occurs when the proportion of elderly increases, but they remain productive and contribute to the country's economy (Amania & Usman, 2024). The United Nations (2017) wrote that the elderly contribute to the economy through their active participation in both the formal and informal workforce, taxes, consumption, and the transfer of assets and resources to their families and communities. This means that the elderly population who are still productive can contribute to the economy or drive economic growth.

The focus on elderly individuals in this study is motivated by the growing phenomenon of population ageing, which has become a major development challenge globally, including in Indonesia. This issue is increasingly reflected in sustainable development agendas that emphasize inclusive economic participation across all age groups (United Nations, 2017). In Indonesia, the relevance of elderly entrepreneurship is further strengthened by the central role of enterprises, where a substantial share of business owners are aged 60 years and above (Kementerian UMKM, 2025). From a theoretical perspective, the role of entrepreneurship in economic growth is explicitly explained by Schumpeterian growth theory, which posits that long-term economic growth is driven by innovation generated through entrepreneurial activities. Entrepreneurs act as agents of innovation by investing, taking risks, and introducing new or improved products and production processes, which in turn stimulate productivity growth through the mechanism of creative destruction (Aghion et al., 2015). Accordingly, entrepreneurship constitutes a key channel through which economic growth can be sustained in ageing societies.

Currently, more and more older people are contributing to the entrepreneurial ecosystem (Lee, 2017). Bojanić et al. (2024) discusses silver entrepreneurship, which refers to older adults with the ability and experience to start their own businesses. His research used a literature review as the research method, and the results stated that entrepreneurship can be a golden opportunity amidst an aging population. Silver entrepreneurship contributes to economic growth and development by creating new businesses, opening up job opportunities, and stimulating the economy. The high number of older people who are entrepreneurs is also seen in Indonesia. According to

the Elderly Population Statistics by BPS (2023b), 53.93 percent of the elderly population in Indonesia is employed, and 68.03 percent of the employed elderly are entrepreneurs. This means that the majority of the elderly population in Indonesia is still productive, with most working as entrepreneurs.

Some studies (Stel et al., 2005; Koç et al., 2025) use TEA (Total Early-stage Entrepreneurial Activity) as a variable to measure the level of entrepreneurship in a country. TEA is the percentage of the working-age population (typically 18–64 years old) who are starting or have recently started a business (Global Entrepreneurship Monitor, 2025). Research by Stel et al. (2005) shows that TEA has a positive impact on GDP growth in relatively wealthy countries but a negative impact in relatively poor countries. More recent research by (Koç et al., 2025) indicates that TEA has negative impact on per capita GDP among 22 countries with the highest innovation rates. Besides TEA, there are various studies that use other variables to represent entrepreneurship. Xu et al. (2021) conducted research in 31 provinces in China, and the results showed that entrepreneurship (the ratio of the number of entrepreneurs to the number of employees) played a positive role in driving per capita GDP in the advanced eastern coastal regions and the central regions but had a negative impact on the relatively backward western regions. In Indonesia, entrepreneurs are divided into 3 groups: self-employed, assisted by unpaid workers, and assisted by paid workers. Kadarusman (2020) found that the number of entrepreneurs in each group did not significantly affect per capita GDP growth, but it did affect the value of per capita GDP. His research suggested this was because Indonesia had a relatively large number of entrepreneurs, which led to a higher per capita GDP value but did not result in higher per capita GDP growth. Regarding per capita GDP value, the number of self-employed entrepreneurs had a negative and significant impact, while the number of entrepreneurs without hired labor and the number of entrepreneurs with hired labor had a positive and significant impact on per capita GDP value.

The results of previous studies that found a negative impact of entrepreneurship on economic growth indicate several things. According to Stel et al. (2005), this negative impact does not mean that entrepreneurship should be prevented in relatively poor countries. In fact, this indicates: (a) Small number of large businesses in developing countries. Large companies play a crucial role in driving an economy from developing to developed. With their large scale of operations, they can produce medium-tech products. Large companies also absorb many local workers and provide them with training, making them more productive than if they were running small shops and struggling as entrepreneurs. In countries with many large companies, nearby small businesses can thrive because they can act as suppliers to the large companies and learn a lot from them; (b) Entrepreneurs in developing countries have lower human capital compared to entrepreneurs in developed countries. Most likely, in developing countries, there are more small-scale entrepreneurs who might be more productive if they became workers (wage earners) in larger companies. Conversely, in developed countries, entrepreneurs are more innovative in new sectors, such as software

companies. Although there are not many large companies and not many people with high levels of human capital in developing countries, it is still wise to encourage entrepreneurship if the alternative is unemployment (Stel et al., 2005).

There are various reasons why elderly in Indonesia continue to work and work as entrepreneurs. Anwar in BPS (2023a) explains that the factors influencing the elderly to continue working include having strong physical and mental health, economic pressure, and self-actualization motives. Izdiha & Kalamika (2018) conducted research on the reasons that motivate the elderly to become entrepreneurs in Yogyakarta and found the Creative Elderly Group, a community of elderly in Wirokerten Village. These elderly want to continue working to keep themselves active during their free time. In addition, this elderly group also receives support from the Department of Industry and Cooperatives (Disperindagkop) in the form of entrepreneurship training and guidance, as well as business capital and production equipment assistance. It is this spirit from within the community and the support of people from outside (both the government and others) that guides the elderly to remain productive through entrepreneurship. Thus, the elderly become one of the subjects of regional development and contributors to the regional economy.

Besides entrepreneurship, previous research used other variables that were believed to influence economic growth. Xu et al. (2021) found that an increase in human capital, measured by average years of schooling across 31 provinces in China, had an impact on economic growth from east to west, with lagging regional economies in the western regions having greater growth potential. Koç et al. (2025) also found that average years of schooling is positively and significantly correlated with per capita GDP in 22 countries. Additionally, according to Schumpeter's theory of growth (Aghion et al., 2015), growth is closely related to information and communication technology, including the internet. However, Gulvira et al. (2024) found that internet usage did not have a significant impact on per capita GDP growth, whether in developed or developing countries.

Unfortunately, the author has not yet found research in Indonesia that focuses on the elderly as entrepreneurs and their impact on economic growth. Some research focused on female entrepreneurs, entrepreneurs in general (of working age), and the factors that motivate elderly in Indonesia to choose to work. Therefore, this research was conducted with the primary aim of determining whether elderly entrepreneurs, given the current aging population, provide a boost to regional economic growth in Indonesia. If the hypothesis that entrepreneurship by the elderly drives regional economic growth is proven, it could be a sign that Indonesia has the potential to experience a second demographic bonus, where the aging population benefits the Indonesian economy due to productive elderly entrepreneurs.

The first research gap in this study is the research sample, which focuses on elderly entrepreneurs (aged 60 and over), specifically those who are self-employed, those who are assisted by unpaid labor, and those who are assisted by paid labor. This aims to determine the impact of each of the three groups of elderly entrepreneurs on the

region's economic growth. Second, this research utilizes panel data covering 34 provinces in Indonesia over a five-year period, from 2020 to 2024. This aims to estimate the influence of elderly entrepreneurs in each province on the Gross Regional Domestic Product (GRDP) in each province in Indonesia. Besides researching the latest data, the study was conducted from 2020 to 2024 to understand the patterns of interaction and life of people who transformed toward digital during the Covid-19 pandemic (BPS, 2024), thus allowing for the inclusion of the internet usage variable, which is also believed to influence economic growth. Third, this research uses a quantitative method with two types of analysis: descriptive statistical analysis and regression analysis on panel data regarding the influence of elderly entrepreneurship on economic growth in 34 provinces in Indonesia from 2020 to 2024.

METHOD

This research began with a descriptive analysis of the condition of the elderly population in Indonesia from 2020 to 2024. Subsequently, the study tested the hypothesis of whether the percentage of elderly entrepreneurs significantly impacts per capita Gross Regional Domestic Product (GRDP) growth in 34 provinces in Indonesia from 2020 to 2024 using panel data regression analysis, processed with *Eviews 12.0* software. Additionally, this study also analyzes other variables believed to influence provincial GDP, namely the average years of schooling for the elderly and the percentage of elderly using the internet.

Table 1. Summary of Variable

Variables	Sign	Unit	Source
Growth rate of per capita GRDP (Y)	GR	%	BPS, Growth Rate of per Capita GRDP at 2010 Constant Market Prices by Province
Self-employed elderly (X ₁)	ENT1	%	BPS, Statistik Lanjut Usia
Self-employed elderly assisted by unpaid worker (X ₂)	ENT2	%	BPS, Statistik Lanjut Usia
Self-employed elderly with permanent wage employee (X ₃)	ENT3	%	BPS, Statistik Lanjut Usia
Average years of schooling in elderly population (X ₄)	EDU	years	BPS, Statistik Lanjut Usia
Internet usage by elderly population (X ₅)	INT	%	BPS, Statistik Lanjut Usia

Source: BPS, processed, 2025

Descriptive statistical analysis in this study aims to determine the demographic, educational, health, and employment conditions of the elderly population in Indonesia. This analysis was conducted by creating graphs and tables that highlight the average, highest, and lowest values of the elderly population's condition in 34 provinces across Indonesia from 2020 to 2024.

The panel data regression analysis in this study aims to determine the influence of elderly entrepreneurship (self-employed elderly, self-employed elderly assisted by

family/unpaid labor, and self-employed elderly with paid labor) on per capita GRDP growth. Therefore, the regression model used can be formulated as follows:

$$GR_{it} = \beta_0 + \beta_1 ENT1_{it} + \beta_2 ENT2_{it} + \beta_3 ENT3_{it} + \beta_4 EDU_{it} + \beta_5 INT_{it} + \epsilon_{it} \dots (1)$$

GR: growth rate of per capita GRDP; *ENT1*: percentage of self-employed elderly; *ENT2*: percentage of self-employed elderly assisted by unpaid worker; *ENT3*: percentage of self-employed elderly with permanent wage employee; *EDU*: average years of schooling in elderly population; *INT*: percentage of internet usage by elderly population; β_0 : intercept; *i*: 34 provinces; *t*: 2020-2024.

In panel data regression, there are various stages of analysis. First, this regression will be estimated using three estimation methods (CEM, FEM, and REM) and will undergo several tests (Chow Test, Hausman Test, and Lagrange Multiplier Test) to select the best model (Basuki, 2021). Second, a classical assumption test was also conducted. According to Basuki (2021), performing a multicollinearity test and a heteroscedasticity test is sufficient for conducting classical assumption tests on panel data. The multicollinearity test is conducted to detect whether there is a correlation or relationship between independent variables in a regression model. Meanwhile, the heteroscedasticity test aims to detect whether the variance of the error (residual) in the panel regression model is constant (homoscedastic) or variable (heteroscedastic) across observations (both across time and across individuals). Third, t-tests and F-tests were conducted to determine the influence between variables or test hypotheses. The t-test was used to determine the partial influence of the independent variables on the dependent variable, while the F-test was used to determine the suitability of the regression model by testing whether one or more independent variables in the model jointly influence the dependent variable.

RESULT

Over the past five years, the percentage of the elderly population has been on an upward trend. Based on age group, the majority of the elderly are young elderly (aged 60-69) at 63.29 percent, the remaining 28.11 percent are middle-aged elderly (70-79 years old), and 8.61 percent are old elderly (aged 80 years and over). Half of the total elderly population are household heads. The majority of elderly men are household heads, while the majority of elderly women are household members (BPS, 2024).

Table 2. Proportion of Elderly Population by Province in 2024

No.	Province	≥ 60 Years Old	No.	Province	≥ 60 Years Old
1.	DI Yogyakarta	16.28	18.	Sumatera Selatan	10.23
2.	Jawa Timur	16.02	19.	Kalimantan Barat	10.21
3.	Jawa Tengah	15.46	20.	Sumatera Utara	10.16
4.	Sulawesi Utara	14.18	21.	Nusa Tenggara Timur	10.16
5.	Bali	14.01	22.	Sulawesi Tengah	9.99
6.	Sulawesi Selatan	12.36	23.	Banten	9.56
7.	Lampung	11.54	24.	Maluku	9.55
8.	Kalimantan Selatan	11.36	25.	Kalimantan Timur	9.49

No.	Province	≥ 60 Years Old	No.	Province	≥ 60 Years Old
9.	Jawa Barat	11.25	26.	Kalimantan Utara	9.26
10.	Papua	11.02	27.	Kalimantan Tengah	9.10
11.	Gorontalo	10.92	28.	Aceh	9.01
12.	Bengkulu	10.88	29.	Maluku Utara	8.94
13.	Jambi	10.70	30.	Sulawesi Tenggara	8.93
14.	Sumatera Barat	10.67	31.	Sulawesi Barat	8.83
15.	DKI Jakarta	10.64	32.	Riau	7.67
16.	Kep. Bangka Belitung	10.41	33.	Kepulauan Riau	6.62
17.	Nusa Tenggara Barat	10.36	34.	Papua Barat	6.34
Mean = 10.65					

Source: BPS, Statistik Penduduk Lanjut Usia, processed, 2025

A region is said to have an aging population structure when the percentage of elderly in that region reaches 10 percent or more (Adioetomo, 2020). Table 2 shows the ranking of the percentage of elderly population by province in 2024. It can be seen that as many as 21 provinces in Indonesia have reached an elderly population percentage above 10 percent. This means that the majority of provinces in Indonesia have reached the population aging phase. The province with the highest elderly population is DI Yogyakarta (16.28 percent), followed by East Java (16.02 percent) and Central Java (15.46 percent). Based on publications over the past five years, DI Yogyakarta has consistently held the top position with the largest proportion of elderly residents. Meanwhile, West Papua Province has the lowest proportion of the elderly population (6.34 percent). Out of the 34 provinces in Indonesia, it was found that the average elderly population is 10.65 percent, indicating that provinces in Indonesia have entered the phase of an aging population structure.

Table 3. Descriptive Statistics of Elderly Education

	Average Years of Schooling (EDU)	Internet Usage (INT)
Mean	5.777	18.487
Median	5.655	16.480
Maximum	9.800	64.730
Minimum	2.940	2.620
Std. Dev.	1.192	11.042
Observation	170	170

Source: BPS, Statistik Penduduk Lanjut Usia, processed, 2025

Education is one form of human capital, commonly measured by average years of schooling (Xu et al., 2021; Koç et al., 2025). Table 3 shows that the average year of schooling for the elderly is 5.7 years, which is equivalent to not completing elementary school. For five consecutive years, DKI Jakarta and West Nusa Tenggara each had the highest and lowest average years of schooling for the elderly. Elderly in DKI Jakarta Province have an average of 9 years of schooling, equivalent to completing junior high school, while elderly in West Nusa Tenggara Province only have an average of about 3 years of schooling, equivalent to not completing elementary school. This indicates a gap in access to education between provinces in Indonesia.

Besides average years of schooling, there is data on technology access by the elderly. Table 3 shows that the average percentage of elderly using the internet is 18 percent. The percentage of elderly using the internet has continued to increase over the past five years. In fact, in 2024, the percentage of elderly accessing the internet (27.36 percent) doubled compared to five years prior (10.40 percent). DKI Jakarta has been at the top for five consecutive years, with 43-64 percent of its elderly population using the internet. Meanwhile, the province with the lowest percentage of elderly residents accessing the internet over the past five years is only around 2-13 percent. This indicates differences in the characteristics of the elderly regarding internet usage across various provinces in Indonesia.

Susenas produces health indicators that generally describe the health of the elderly, namely the percentage of the elderly who have health complaints and the morbidity rate of the elderly. The health complaints referred to both physical and psychological complaints experienced by the elderly in the past month. The morbidity rate for the elderly indicates the situation when the elderly experience health complaints that interfere with their daily activities (BPS, 2024).

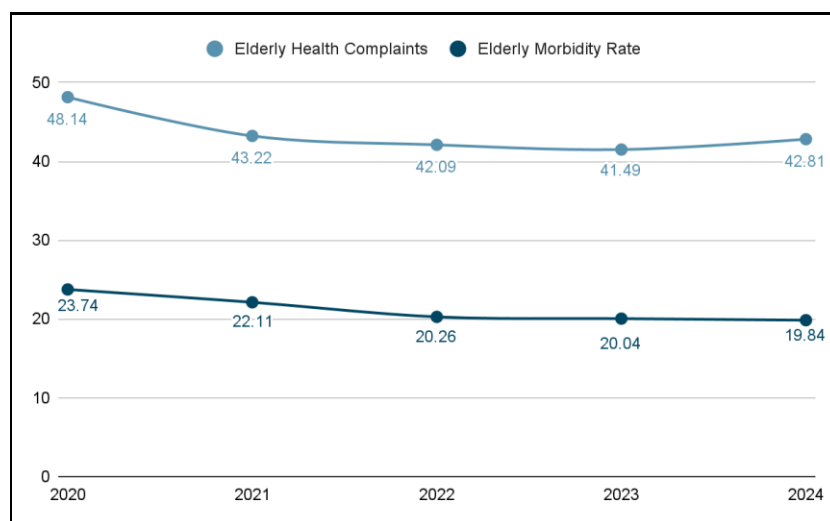


Figure 2. Percentage of the Elderly Reporting Health Complaints and Morbidity Rate in 2020-2024

Source: BPS, *Statistik Penduduk Lanjut Usia* (2024)

Based on Figure 2, 42.81 percent of the elderly have health complaints, and the morbidity rate among the elderly is approximately 20.71 percent in 2024. This means that almost half of the total elderly population experiences health complaints, and one-fifth of the elderly population has health complaints that interfered with their activities in the past month. Nevertheless, this percentage has relatively decreased compared to five years ago. The majority of elderly who experience health complaints try to treat their symptoms themselves, such as by taking over-the-counter medication from the pharmacy, scraping, and massage. The reason elderly do not seek outpatient care is because they can self-treat and feel they do not need to see a doctor, believing they will get better on their own.

The increase in the elderly population is also accompanied by a large number of working elderly. There has been a growing trend in the percentage of working elderly over the past ten years (BPS, 2024).

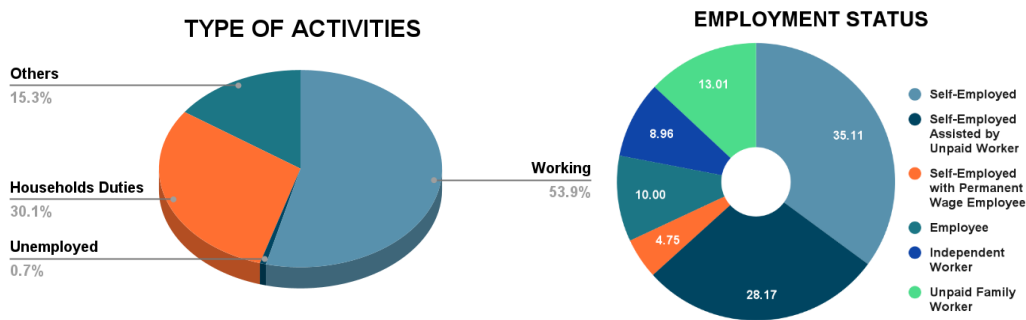


Figure 3. Percentage of Elderly Workers by Employment Status in 2023

Source: BPS, *Statistik Penduduk Lanjut Usia* (2023)

Based on Figure 3, 53.9 percent of the elderly population in Indonesia is employed, and a very small percentage of the elderly are unemployed. Of the working elderly, 68.03 percent are self-employed. Self-employed and self-employed assisted by unpaid workers have a significantly larger percentage compared to self-employed with permanent wage employees.

Table 4. Descriptive Statistics of Elderly Self-Employed

	Self-Employed (ENT1)	Self-Employed Assisted by Unpaid Worker (ENT2)	Self-Employed with Permanent Wage Employee (ENT3)
Mean	36.277	29.710	4.812
Median	35.630	30.715	4.400
Maximum	52.150	51.410	18.370
Minimum	23.680	8.680	0.480
Std. Dev.	6.228	8.203	2.838
Observation	170	170	170

Source BPS, *Statistik Penduduk Lanjut Usia*, processed, 2025

The average proportion of self-employed elderly is 36.2 percent (Table 4). Riau Islands has been the province with the highest number of self-employed elderly for three consecutive years, while the province with the lowest number of self-employed elderly has varied from year to year. The average proportion of elderly who are self-employed assisted by family/unpaid workers (ENT2) is 29.7 percent. West Sulawesi has been the province with the highest number of elderly assisted by unpaid workers three times in the last five years, while the province with the lowest number of elderly assisted by unpaid workers has been DKI Jakarta for four consecutive years. The average proportion of elderly who are self-employed or assisted by paid workers (ENT3) is 4.8 percent. Riau has been the province with the highest number of elderly entrepreneurs employing workers in the last four years, while the province with the lowest number of elderly assisted by paid workers has been Papua for the last two years.

The first step in panel data regression is to estimate the data using three approaches: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). Subsequently, the most appropriate method to use needs to be selected through model selection (Chow Test, Hausman Test, and Lagrange Multiplier Test). The results indicate that the most appropriate model to use in this study is the Fixed Effect Model (FEM). Robustness checks were conducted using alternative panel data specifications, FEM and REM. Although the level of statistical significance varies across specifications, the direction of the estimated coefficients remains consistent, indicating qualitatively robust results. The second stage is the classical assumption test. The results show no correlation between the independent variables, or no multicollinearity symptoms in this regression model. However, one variable exhibited heteroscedasticity symptoms. If heteroskedasticity occurs, then use GLS (Generalized Least Square) (Gujarati & Porter, 2009:375), which can be done by selecting Cross-Section Weights in GLS Weights within the *Eviews* application (Iqbal, 2015). Therefore, the FEM GLS method is used in this study.

Table 5. Results of T-Test and F-Test with FEM GLS Estimation

Variables	Coefficients	Std. Error	t-Statistic	Prob
C	4.1458	6.7212	0.6168	0.5384
ENT1	0.2162	0.0787	2.7482	0.0068*
ENT2	0.0538	0.0778	0.6913	0.4906
ENT3	-0.4551	0.1168	-3.8959	0.0002*
EDU	-2.4287	0.6761	-3.5923	0.0005*
INT	0.3015	0.0325	9.2808	0.0000*
R-squared	0.6654			
Adjusted R-squared	0.5684			
F-statistic	6.8570			0.0000

*Significant at 5% level

Notes: ENT1 (self-employed), ENT2 (self-employed assisted by unpaid worker), ENT3 (Self-Employed with Permanent Wage Employee), EDU (average years of schooling), INT (internet usage).

Source: Processed Data, 2025

The results of the t-test are shown in Table 5, which can be formulated as in Equation 2 in model form.

$$GR_{it} = 4,1458 + 0,2162 ENT1_{it} + 0,0538 ENT2_{it} - 0,4551 ENT3_{it} - 2,4287 EDU_{it} + 0,3015 INT_{it} + \epsilon_{it} \dots\dots\dots (2)$$

The variables *ENT1* and *INT* have a positive effect, while the variables *ENT3* and *EDU* have a negative effect on per capita GRDP growth. F-test results show that the probability value of the F-statistic is 0.0000 or less than 0.05. This means that *ENT1*, *ENT2*, *ENT3*, *EDU*, and *INT* collectively have a significant effect on per capita GDP growth. The Adjusted R-squared value of 0.5684 indicates that per capita GDP growth can be explained by *ENT1*, *ENT2*, *ENT3*, *EDU*, and *INT* by 56.84 percent, while the remaining 43.16 percent is influenced by other variables outside the model.

DISCUSSION

The research results show that the percentage of self-employed elderly (*ENT1*) has a positive and significant effect on per capita GRDP growth. The regression coefficient is 0.2162, which means that if the percentage of self-employed elderly increases by 1 percent, per capita GRDP growth will increase by 0.2162 percent.

The results of this study differ from the findings of [Nurmalia et al. \(2020\)](#) and [Kadariusman \(2020\)](#), who stated that self-employed entrepreneurs have a negative and significant impact on economic growth. This difference in results is likely due to the difference in the populations studied. Previous research focused on the working-age population in general, whereas this study focuses on the elderly population. The findings of this study are actually consistent with [Verheul & van Stel \(2010\)](#), who stated that older entrepreneurs contribute more to economic growth in developing countries than younger entrepreneurs. Moreover, [Azoulay et al. \(2020\)](#) found that successful entrepreneurs are middle-aged or beyond, not young. Therefore, these findings strengthen the argument that elderly entrepreneurship has a positive impact on economic growth.

In this era of an aging population, the number of elderly is increasing. Generally, the elderly have low physical stamina and limited job opportunities in the formal sector, leading to the expectation that they are no longer productive. However, it turns out that the majority of elderly in Indonesia are still working, and most of those who are working are entrepreneurs. This means that the elderly are not a burden but contribute to the growth of per capita GDP. According to [Stel et al. \(2005\)](#), although there are not many large-scale businesses, entrepreneurship remains a better economic alternative than being unemployed.

From a production approach, self-employed elderly individuals contribute to the value of regional GDP through their business units, which generate added value from the goods and services produced. From an income approach, self-employed elderly individuals contribute to the value of regional GDP through their business surplus or profit. Thus, increasing the percentage of self-employed elderly can boost per capita GDP growth.

The research results show that the percentage of the elderly who are assisted by unpaid labor (*ENT2*) does not significantly affect the growth of per capita GRDP. When viewed from three approaches, unpaid labor only contributes to GRDP through the production approach, namely by adding value to the goods or services they produce in business units. Meanwhile, according to the income approach, unpaid labor is typically family members who do not receive direct wages. This is believed to be the reason for its small or statistically insignificant impact on GDP growth.

The research results show that the percentage of elderly who are assisted by paid laborers (*ENT3*) has a negative and significant effect on per capita GRDP growth. The regression coefficient is -0.4551, which means that if the percentage of elderly workers assisted by paid labor increases by 1 percent, the province's economic growth will

decrease by 0.4551 percent. This result is quite interesting. The presence of paid labor should indicate a larger scale of business, thus boosting economic growth, as found in the studies by Nurmalia et al. (2020) and Kadarusman (2020). However, the results show a negative effect, indicating a small number of large companies, so many workers are employed in small businesses, as found in the study by Stel et al. (2005). This is evidenced by the fact that 99.99 percent of businesses in Indonesia are MSMEs (Micro, Small, and Medium Enterprises), and 96.92 percent of the total workforce is absorbed by MSMEs (Kementerian UMKM, 2019). Not a few workers accept jobs that are not in line with their skills, resulting in lower wages and lower labor productivity compared to their actual capabilities (Kementerian Ketenagakerjaan, 2024). If the productivity levels between small and large companies in Indonesia are compared, assuming the productivity of large companies is 100 percent, it is found that the productivity level of small companies (MSMEs) is only 25 percent, resulting in a productivity gap of 75 percent between small and large companies (Madgavkar et al., 2024). It can be concluded that the productivity level of small companies tends to be lower than that of large companies in Indonesia. So, what is the relationship between the large number of workers in small companies (with low productivity levels) and the growth of Gross Regional Domestic Product (GRDP)?

Elderly who are trying to work are not a problem because entrepreneurship is a better economic alternative than not working, considering it is generally known that opportunities for the elderly to work in the formal sector are decreasing. However, for employed workers, if more and more workers are employed in small businesses, while it is possible that they would be more productive if they worked in larger companies, this could affect the GDP growth, which tends to weaken. In the production approach, GDP is calculated from the value of output (selling price multiplied by production volume) minus the cost of raw materials. Low productivity results in low production volume, leading to low output value. In the end, the GDP value is weak. Therefore, the more elderly entrepreneurs who employ workers (with small-scale businesses and lower productivity levels), the more per capita GDP growth declines.

Each type of silver entrepreneurship (*ENT1*, *ENT2*, and *ENT3*) shows a different impact on per capita GRDP growth. Based on the results, it can be concluded that in an aging population era, silver entrepreneurship, including self-employment among the elderly, does not constitute an economic burden but rather contribute positively to per capita GRDP growth. However, the increase in the number of silver entrepreneurship employing paid labor (with indications of small business scale and low productivity levels) tends to weaken per capita GDP growth because the value added of production is also low.

This study also found that *EDU* has a negative and significant effect on per capita GRDP growth. The regression coefficient is -0.8123, which means that if the average years of schooling increase by 1 year, per capita GDP growth will decrease by 0.8123 percent. This result differs from previous studies (Xu et al., 2021; Koç et al., 2025), which showed a positive influence of *EDU* on economic growth. This difference is due to the different research samples where the study was conducted on the general population, while this

study focuses on the elderly population. BPS (2023b) show that higher levels of education tend to be associated with a lower percentage of working elderly. The majority of elderly who have completed higher education are not working; 41.31 percent are homemakers, 22.41 percent are engaged in other activities, and 0.47 percent are unemployed. In fact, according to the income approach, working elderly contribute to regional GDP through the wages they receive or the profits they generate from their businesses. Therefore, the higher the average years of schooling for the elderly, the less they participate in the labor market in their old age, which negatively impacts per capita GRDP growth.

On the other hand, this study found that internet usage has a positive and significant impact on per capita GRDP growth. The regression coefficient is 0.3015, which means that if the percentage of elderly using the internet increases by 1 percent, per capita GRDP growth will increase by 0.3015 percent. These findings differ from previous research (Gulvira et al., 2024), which stated that internet usage did not have a significant impact on economic growth. Elderly who access the internet can become part of the digital economy, such as by using e-commerce, digital banking, or online healthcare services (telemedicine). This usage can boost economic activity, considering the rapid post-pandemic digitalization (BPS, 2024). In accordance with the Schumpeterian growth theory, which states that growth is closely linked to technological adaptation. From an expenditure approach, elderly who use the internet contribute to GDP through their consumption in the digital market. From an income approach, elderly who use the internet contribute to GDP through business profits or income earned as a result of adapting their work to technology.

CONCLUSION

Based on the descriptive analysis, most elderly individuals in Indonesia are young-old (aged 60–69), male, and heads of households. Twenty-one provinces have elderly populations exceeding 10 percent, indicating an aging population structure. There are significant disparities in the elderly's average years of schooling and internet use across provinces, though internet access continues to rise. Nearly half of the elderly experience health complaints, but the trend has declined over the past five years. More than half remain employed, with the majority working as entrepreneurs.

Regression results for 34 provinces from 2020 to 2024 show that the percentage of self-employed elderly (*ENT1*) has a partial positive and significant effect on per capita GRDP growth. The percentage of elderly working with unpaid labor (*ENT2*) has no significant partial effect on per capita GRDP growth, and the percentage of elderly working with paid labor (*ENT3*) has a partial negative and significant effect on per capita GRDP growth. Based on the results, it can be concluded that in the era of population aging, silver entrepreneurship, particularly those who are self-employed, contribute positively to per capita GRDP growth rather than becoming an economic burden. Conversely, an increase in silver entrepreneurship involving paid labor tends

to weaken growth due to the low value added of small-scale, low-productivity businesses. Furthermore, while the average years of schooling among the elderly negatively affect regional economic growth, internet use has a positive effect. Overall, the proportions of silver entrepreneurship groups, education level, and internet usage significantly influence regional economic growth.

In facing population aging, policies should focus on enhancing elderly productivity. The government can support elderly entrepreneurship through dedicated business development loans and mentoring programs to identify business opportunities, improve productivity, and encourage expansion. Future studies could broaden the scope by including more provinces, a longer period, or additional variables and methods to enrich understanding of silver entrepreneurship's role in regional economic growth.

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