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THE RETIREMENT CONSUMPTION PUZZLE EFFECT IN INDONESIA: EVIDENCE FROM IFLS 4 AND 5

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ABSTRACT

Introduction/Main Objectives: This study aims to see whether the retirement consumption puzzle occurs in Indonesia. The retirement consumption puzzle refers to when there is a decline in consumption in retirement which is not in line with the life-cycle hypothesis. **Background Problems:** Previous studies have revealed that consumption shifts when entering retirement due to efficient spending. This research analyzes the consumption pattern of the Indonesian elderly peculiarly in the frame of the retirement consumption puzzle. **Novelty:** There is a lack of studies on the effect of retirement on consumption by Indonesian retirees and prior research has focused on the impact of retirement on household expenditure. **Research Methods:** This study uses data from the Indonesian Family Life Survey (IFLS) wave 4 and 5 from the years 2007 and 2014. It uses panel data and the total sample is 2,556. It also uses the difference in differences (DiD) method to see whether the change in labor status toward retirement causes a decrease in consumption in households in Indonesia. Then, this study also uses the division of age categories as the robustness check. **Finding/Results:** The results of this study show that there is a retirement consumption puzzle in Indonesia indicated by a decrease of 19.9% in total expenditure per capita. **Conclusion:** The consumption decrease in retirement demonstrates that the government should consider pension funds and create social security programs to maintain the welfare of elderly people.

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INTRODUCTION

Retirement, more than any other life event, is a major change that can be predicted due to a change in a person's age and regulations regarding the age limit for working. Retirement itself refers to a person's lifetime after leaving the workforce from a position or job permanently because he or she has reached a certain age limit, thus affecting household income. Households usually respond to these difficulties by cutting their consumption, especially for non-essential goods.

Recent studies show the negative effects of retirement on household expenditure on consumption (Beblo and Schreiber, 2021), household consumption outside the home (Redmood and McGuinness, 2022), consumption by men of retirement age (Jeon and Park, 2020; Chen et al., 2017), and overall household expenditure (Been, Rohwedder, and Hurd, 2021). When household members, especially the heads of the household, reach retirement age, household income decreases and the household expenditure budget decreases.

Other studies have yielded different results showing that the retirement period increases household expenditure on consumption. The retirement period exhibits an increase in the consumption patterns of retirees toward healthy food (Smed, Ronnow, and Tetens, 2022; Atalay et al., 2020), increased consumption expenditure and assets (Unnikrishnan & Imai, 2020), and demand for tourism consumption (Deng et al., 2022). This reflects people's awareness of health and well-being in retirement, so they tend to care more about the need for healthy food and entertainment through tourism. The contradiction of the impact of pension on consumption expenditure is an issue of the consumption regiment puzzle.

Manajit et al. (2020) identified a puzzle regarding pensioner consumption in Thailand where retirees tend to increase food consumption and housing patterns. Readiness to enter retirement affects consumption patterns in India. Groups with good financial management and pension funds will increase spending on food and non-food consumption (Unnikrishnan & Imai, 2020). Based on measurements of weight and BMI, retirement status also increases healthiness due to the marginal consumption of food for retirees in China (Feng et al., 2020).

Knowing how retirees consume in their old age is good information for policy making and analyzing the conditions of retirees in Indonesia. In 2019, the United Nations indicated that the number of people who were approaching retirement age was increasing globally and Indonesia was no exception. Indonesia is currently entering a period of an aging population, where there is an increase in life expectancy followed by an increase in the number of elderly people.

Table 1. The Number of Elderly Population in Southeast Asia (million)

Country	2010	2015	2020
Brunei	0.012	0.02	0.025
Cambodia	0.453	0.924	0.775
Indonesia	14.13	15.342	16.302
Laos	0.256	0.276	0.288
Malaysia	1.445	1.848	2.296
Myanmar	1.602	2.605	3.282
Philippines	3.76	4.120	5.48
Singapore	0.459	0.605	0.812
Thailand	4.767	7.161	7.98
Timor-Leste	0.036	0.060	0.052
Vietnam	7.112	6.419	7.696

Source: World Population Data Sheet, 2010-2020

The growth of the aging population in Southeast Asia over the last two decades has been seen in the range of 3% to 11%. Singapore,

with the lowest population, occupies the highest position in terms of its elderly population with a dependency ratio of 9% (2010), 11% (2015), and 14% (2020) of the total population. However, if you compare the number of elderly people in different countries, Brunei is the country with the least old population, numbering only 25,000 people in 2020.

On the other hand, as seen in Table 1, Indonesia experienced an increase in the number of elderly people from 14 million people in 2010 to 16.3 million (15.3%) in 2020. According to the Ministry of Health (2019), it is projected that it will continue to increase to 48.2 million people (15.8%) by 2035. However, this presents a new challenge for the government regarding how to overcome the problem of a higher dependency ratio as a result of the increasing elderly population in Indonesia.

A report by the National Team for the Acceleration of Poverty Reduction (TNP2K) on "Old-Age Poverty in Indonesia: Empirical Evidence and Policy Options" found that there is poverty among the elderly population. This study also showed that the poverty rate for the elderly increases as age increases. The Indonesia Social and Economic Survey (SUSENAS) in 2012 reported that the percentage living in poverty at the age of 65 years and above is 13.81%, while at the age of 70 years and above it is 14.92%, and at the age of 75 years and above it is 15.42%. These findings implied that the elderly population in Indonesia is vulnerable in terms of their economic survivability. The retirement consumption condition can also be an indicator in determining the welfare condition of the aging population. Even so, the change in household consumption patterns of retirees also could be a representation of national consumption if it is calculated on an aggregate basis.

There is a lack of studies related to the consumption by Indonesian retirees. Previous studies that have been conducted in Indonesia only focus on the impact of pension funds on household consumption such as The Impact Evaluation of Pension Funds on Household Consumption: A Study from The Indonesian Family Life Survey (Lapau, 2017) and Analysis of Pension Fund Utility in Fulfilling Daily Needs on Retired Civil Service Teacher in Medan (Tanjung and Pratomo, 2013). Previous research has a dichotomy in observing the effect of retirement on reducing food consumption (Aguila et al., 2011; Cho, 2012; Chen et al., 2017; Atalay et al., 2020; Juhro & Iyke, 2020; Manajit et al., 2020; Unnikrishnan & Imai, 2020; Smed et al., 2022), tourism demand (Deng et al., 2022), housing (Kim et al., 2021). Meanwhile, this study uses the difference-in-differences (DiD) model to identify the impact of retirement on Indonesia's total per capita expenditure through micro-panel survey data for 2007 and 2014. Further studies that explore the consumption of Indonesian retirees are needed in order to find out what conditions they experience. Namely, does the consumption of the elderly in Indonesia correspond to the retirement consumption puzzle?

Thus, this study seeks to analyze the impact of retirement on household consumption where a decline in consumption will result in a retirement consumption puzzle. This research will examine whether, when people enter retirement age, there is a change in consumption patterns by using the DiD method utilizing employment status as an independent variable determining the consumption using panel data taken from Indonesia Family Life Survey wave 4 and 5 and observing individuals classified using their employment status and categories according to their age.

This article is presented in five sections. Section 2 will discuss the theoretical frameworks and review the previous findings related to the research questions from various countries. In

section 3, the data and methods will be discussed. Section 4 will present the result and the discussion, and section 5 will show the conclusion which can represent the research results.

LITERATURE REVIEW

1. Theories on Consumption, Work-Leisure Analysis, and the Lifetime Retirement Model

Keynes explained that, according to consumption theory, the relationship between income and the price level is expressed in terms of a constant price level, not a nominal price level. The Keynesian consumption theory assumes that current consumption expenditure is primarily determined by current disposable income and that households will increase consumption if their income rises and a portion of that increase is saved (Zakaria, 2018). The total amount saved and the real amount saved are both determined by the household's marginal propensity to consume (MPC). The higher the MPC, the more money is expended and the lower the amount of money saved. Consumption function in the Keynesian sense can be represented as

$$C = a + bYd \quad (1)$$

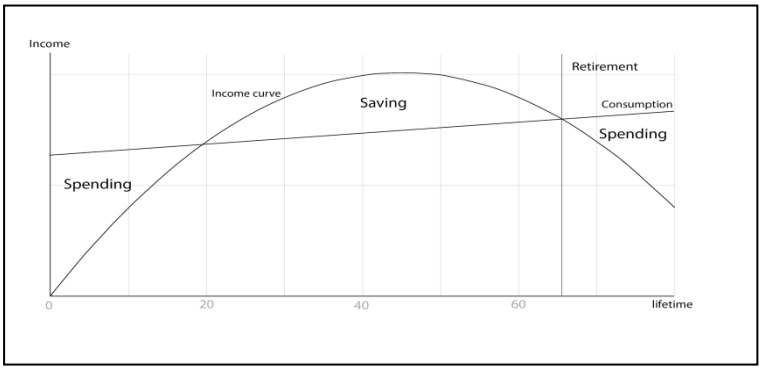
Where:

C represents consumption, a represents autonomous consumption, b refers to the marginal propensity to use (the constant), and Yd refers to the income that can be used by the household (also known as disposable income). This model explains that if an individual's disposable income rises, the consumption of that individual will also increase. In accordance with the explanation of Keynes (1936), although consumption increases and because the income received rises, the increase in consumption is not as big as the increase in income itself, so the unused income is assumed to be savings. According to this model, every individual has a level of consumption that must always be fulfilled without considering income (autonomous consumption). It was also explained that the relationship between income and the price level is not stated in the nominal price level but in a constant price level. Income in this model is defined as current income and not income that comes from the past or the future.

Consumption theory in the life cycle hypothesis uses a model of consumer behavior proposed by Fisher, *et al.* in the 1950s. Fisher's theory emphasizes that individuals' incomes during their lives affect their consumption. This theory explains how savings can be used to transfer one phase of life to another. From this model, Modigliani (1957) also emphasized that individuals' incomes are not always the same during their lives, so that is why people will tend to set aside part of their income when they have a high income for another time when they have a lower income (Paker, 2010).

Hubbard *et al.* (2014) explained that one example of this hypothesis is that people save their income while they are still actively working so that it can be used when they are no longer working or entering retirement. There are several assumptions in this hypothesis including the assertion that people will spend their wealth in their old age and that some will make plans to make wealth by saving money. According to Chen, Hsu, and Weiss (2015),the life cycle hypothesis means that workers will increase their consumption when they retire and reduce the savings they have.

Figure 1. Life Cycle Hypothesis (LCH)



Source: Chen, Hsu, and Weiss, 2015

In this model, the individuals have an expectation of how long they will receive wages or how long they will work. Usually, at the beginning of their working life, members of the workforce will earn relatively lower wages compared to the following years and income will peak at the end of working life and then decline at retirement. Therefore, consumers who want to own property will usually borrow in the early phase and then pay it off in the middle phase or when they have high incomes. Dombusch *et al.* (1998) stated that workers will plan consumption and savings patterns in the long term so that current consumption is only influenced by their expectations and income.

Further, this study used one-period work-leisure analysis. This analysis is a model for analyzing work-leisure that only affects one period. In this model, retirement is seen as something that occurs when the full amount of time available equals leisure. Leisure is assumed to be a normal good, so any increase in income in period t makes work less in that period. Changes in wages received have two different effects; the first effect is that having an increase in purchasing power makes the free time taken more numerous, and the second effect is that having an increase in wages makes leisure time relatively expensive meaning that, when leisure is a normal good, it produces an ambiguous net effect. This model describes a worker's lifetime utility function as following equation below

$$U = U\ (L1, X1, L2, X2, L3, X3, \dots\ Lt, Xt) \quad (2)$$

In this equation, leisure in period t is represented by *Lt*, and goods consumption in period *t* is represented by *Xt*. Therefore, we can formulate an equation (3) to use for the one-period framework as follows:

$$U = U1\ (L1, X1) + U2\ (L2, X2) + U3\ (L3, X3) + \cdots + Ut\ (Lt, Xt) \quad (3)$$

This model only applies annually and each year is carried out separately for the individual's lifetime in order to ensure that there is no borrowing. This model does not explain the relationship between *Ut* and *Ut-1*, nor does it explain the return to the labor force in the next period. However, this model analyzes retirement by examining the effects resulting from changes in labor force participation rather than specifically for the retirement decision.

The calculation of life cycle effects can be used for retirement decisions using a framework that contains standards for demand for leisure. It is described as a simple lifetime retirement model. In this case, leisure is defined as non-working time in units of years and—in order to find out the amount of leisure—we can subtract

the number of years of working time from the number of years of life and use an individual's annual salary for the wage rate (W). From this information, we can formulate the following equation:

$$\text{Max } U(L, \text{Expenditures on goods}) \quad (4)$$

And the budget constraint is:

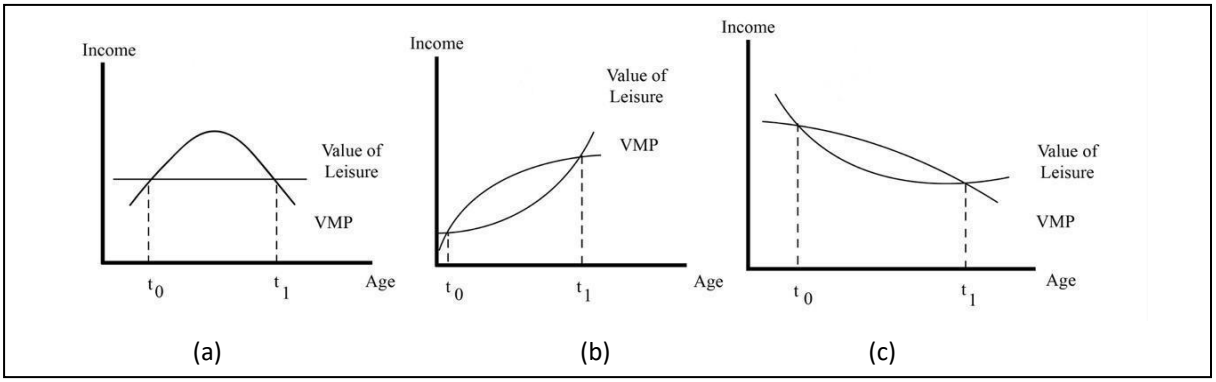
$$\text{Expenditures on goods} = L \times W \quad (5)$$

Thus, if leisure is considered a normal good, and if there is an increase in leisure, then consequently the age of retirement will decrease. However, income and substitution effects occur when there is a change in the annual salary; if the salary increases, it will allow someone to buy more normal goods (including leisure). Meanwhile, the substitution effect is marked by an increase in leisure prices, making the age of retirement rise, meaning that the net effect is ambiguous.

However, this model also assumes that the value of time in the labor market does not depend on the age provided because of the possibility of exogenous changes experienced by workers due to differences in productivity resulting from physical changes as well as endogenous changes in productivity during the life cycle when an individual invests in human capital. This can be described by the time at the beginning of the individual's productive age, they have low human resources but over time the individual realizes to add their value in order to increase their market value but in the final years the value will depreciate.

If leisure does not change with respect to the time allocated to it, and the market time value varies over the life cycle, this allows people to choose to work at certain times compared to other times. This of course means that this model faces problems because the value of leisure can change over time. If the value of leisure does not change, then people will be able to share their leisure time evenly from when they are young to when they are old, such as by taking days off every week and not accumulating that leisure for their old age. This is certainly not good because, if individuals do not use their skills often enough, these skills will not be well honed meaning that putting free time at the same time in retirement is considered more efficient. This model describes non-worked years as retirement. The table below depicts t_0 as the time when the individual starts working and $t_1$when the individual retires.

Figure 2. Simple Lifetime Retirement Model



Source: Milevsky, M. A., 2006

2. Previous Studies

Recent studies have shown the negative effect of retirement on consumption expenditure. Beblo and Schreiber (2021) showed the negative effect of retirement on housing consumption in Germany. A study on households in Ireland by Redmood and McGuinness (2022) showed a negative effect of retirement on household consumption outside the home, while household consumption inside the home was not affected even though some of the income was allocated to this consumption. Jeon and Park (2020) conducted simulations and comparisons through statistical analysis showing a jump in the decline in consumption for men of retirement age or the retirement-consumption puzzle. Then, Been, Rohwedder, and Hurd (2021) examined how US household expenditure decreasing during retirement was partially compensated by increases in home production of the retiring household member.

As for previous studies, the impact of retirement status on consumption appeared in the study by Chen et al. (2017) who found reduced consumption expenditure for men in urban China, reduced total calorie intake, and changed food consumption patterns meaning that they did not conform to the nutritional balance set by the Chinese Nutrition Association. Allais et al. (2020) supported the finding that pensions reduce Pareto consumption. Lee & Shin (2016) observed that there is a positive correlation between decreased consumption before and after retirement. Using the Cobb-Douglas equation, the consumption of utility functions appears to decrease after retirement (Lim et al., 2018). For this reason, Dadashi (2020) emphasized the importance of investment or pension funds to maintain retired consumption patterns and healthy living standards. In a study in Japan, pension patterns were observed through capital allocation as Bonfatti et al. (2022) saw the demographic decline as an important aspect of attracting future capital flows.

By contrast, retirement can increase consumption allocation, as shown in the study by Smed et al. (2022) who identified the food consumption puzzle of pensioners in Denmark. During 10 years of observation, this study found that there was no decrease in the household food consumption budget, but there was an improvement in the consumption pattern of retirees with regard to healthy food. For the single group, after retirement, the average reduced 4% of the total food budget. The same thing was found by Atalay et al. (2020) who showed that consumption of home cooking increased post-retirement and this has driven improvements in the quality of health.

Smed, Ronnow, and Tetens (2022) did not find a retirement food consumption puzzle in Danish households with household heads over 55 years old. This is due to the efficient behavior during retirement meaning there is plenty of time to find cheaper food and choose healthy food. If retirement needs can be anticipated through a standard consumption life cycle model, individuals, and households should be able to minimize the decline in consumption power (Smed et al., 2022). The implementation of the old-age scheme in India through the Indira Gandhi National Old Age Pension Scheme (IGNOAPS) has significantly increased the welfare of the pensioners group through increased consumption expenditure and increased spending on food and non-food assets (Unnikrishnan & Imai, 2020). The effect of reduced consumption on tourism was observed by Deng et al. (2022) who used a regression discontinuity design. In contrast to food consumption, retirement increases the demand for tourism consumption in China. These studies explain why there is a contradiction in retirement consumption using several different methods and

variables to prove whether there is a retirement consumption puzzle.

3. Indonesian Aging Policies

The Indonesian government has tried to ensure that the needs of everyone are met, including elderly people, by enacting several laws. The law that contains the provision of assistance to disadvantaged elderly people is contained in Law Number 4 of 1965. This was the first law created for the elderly in Indonesia. The law is considered progressive in helping the elderly population, where at that time only a small portion of the population in Indonesia was categorized as elderly. Later, this law was replaced by Law Number 13 of 1998 regarding the welfare of the elderly population (TPN2K, 2014). Indonesia also made a law regarding social security as stated in Law Number 3 of 1992 which contains retirement benefits, worker injury benefits, healthcare benefits, and death benefits.

After President Soeharto resigned in 1998, President Habibie made several changes, including a law for elderly: Law No.13 of 1998. It pertains to training, health services, spiritual services, and access to social protection for Indonesian elderly. Responsibility for the welfare of the elderly belongs not only to the elderly family but also to the government and society. However, there were no special programs that were used to improve the welfare of the elderly themselves after that. Then a law that discussed the national security system that is still used today, namely Law No.40 of 2004, regulated the minimum retirement age of 55 years and a maximum of 60 years. There are also regulations regarding the amount of pension set at 70% of the minimum wage. There are also retirement benefits for widows and widowers of 40% and for children 60%.

The latest policy is the Regulation of the Minister of Manpower of the Republic of Indonesia No. 2 of 2022 concerning Procedures and Requirements for Payment of Old Age Security Benefits. This regulation decrees that old-age security benefits are provided with the aim of guaranteeing that participants receive cash if they enter retirement, experience permanent total disability, or die. Therefore, the Regulation of the Minister of Manpower Number 19 of 2015 concerning Procedures and Requirements for Payment of Old Age Security Benefits, which was the mandate of Article 26 paragraph (5) of Government Regulation Number 60 of 2015 concerning Amendments to Government Regulation No.46 of 2015 concerning the Implementation of the Old Age Security Program, was no longer in accordance with the development of the protection needs of old-age security participants so that it needs to be replaced.

METHOD, DATA, AND ANALYSIS

1. Sampling

This study uses the 2007 and 2014 micro data panels from the Indonesia Family Life Survey (IFLS) which present data at the individual, household, and community levels in Indonesia. IFLS is organized by the RAND Corporation in collaboration with Survey Meter, and it had published five times with an interval of seven years. IFLS wave4, which was conducted in 2007 as well as IFLS wave5 which was held in 2014,have been selected for this study. The survey covered a wide range of topics on social capital, demographics, political views, health records, and periodic spending, so it fits in with this study. According to Strauss et al. (2019), IFLS data represented 83% of the population in Indonesia with a total sample of 83,000 for a sample of 15,000 individual households. Apart

from providing broad data coverage, IFLS delivers tremendous micro data because it has a very low attrition rate of 6%.

The head of the household was chosen as the unit of analysis for this study and the status of the worker was the basis for the sample. Heads of household who did not work either in the first survey (IFLS wave 4) or in the second survey (IFLS wave 5) as Labor00; heads of household who did not work in the first survey or had retired and decided to return to work in the second survey (Labor01); heads of household working in the first interview and retired in the second survey (Labor10), i.e. the group of households leaving the labor market and entering the retirement phase; and the final group comprised the heads of household who did not work in both surveys (Labor11), which is the baseline group in the regression.

The output variable used in this study is consumption per capita which consists of three types of expenditure, namely total expenditure, food expenditure, and non-food expenditure. All this information was obtained from the consumption section (KS) in questionnaire 1 book IFLS 4 and 5, all outcome variable data were in Indonesian rupiah (IDR). All expenses are annual expenses and are divided by the number of members, so they are per capita expenses. The three types of expenditure were transformed into logarithmic form and, to eliminate the effect of inflation between the two time periods, the value of each type of expenditure was adjusted for inflation in 2007 and 2014.

The treatment variable was the status of the heads of household; whether they were retired or not. This variable was denoted by a dummy variable, which is equal to 1 if the head of the household was retired and 0 if he had not retired or was still working. As for section 3A book for question 8 was done as retired status. The age limit was seen in the availability of answers that could only be made by respondents who were over 50 years old.

For the control variable, individual characteristics were selected which included labor status, marital status, gender, education, number of household members, location of residence, ownership of a pension fund program, region, ethnicity, and religion.

2. Data collection

Table 3 summarizes the number of observatios, and mean, standard deviation, minimums, and maximums and it is divided into 2 columns. The first column is for IFLS wave 4 and the second column is for IFLS wave 5. The table shows the results of the calculation of all observations using the household level.

Table 2. Control Variables

Variables	Book	Notes
Households Characteristics		
Family Size	Book K, AR 01a	
Residential Location	Book T, SC 05	Dummy 1 = urban
Dummy Province	Book T, SC 01	Dummy 1 = Jakarta
Head Household Characteristics		
Age	Book K, AR 09	
Gender	Book K, AR 09	Dummy 1 = Male
Marriage Status	Book K, AR 13	Dummy 1 = Married
Education	Book K, AR 16	
Ethnicity	Book K, AR 15	Dummy 1 = Javanese
Religion	Book K, AR 15	Dummy 1 = Islam

Source: IFLS wave 4 and wave 5

Table 3. Descriptive Statistics for Research Samples

Variable	Dummy Year = 0 (2007)					Dummy Year = 1 (2014)				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Labor Status (1 if retired)	1278	0.1893	0.391946	0	1	1278	0.2457	0.430668	0	1
Age of Head Household	1278	57.75	7.4888	49	95	1278	63.32	7.117765	50	101
Gender (1 if male)	1278	0.6768	0.467867	0	1	1278	0.7488	0.433858	0	1
Ethnicity (1 if Javanese)	1278	0.4679	0.499165	0	1	1278	0.4875	0.500039	0	1
Religion (1 if Islam)	1278	0.8834	0.321055	0	1	1278	0.8849	0.319175	0	1
Education Level	1270	5.79	4.768543	0	16	1268	5.84	4.834139	0	16
Marriage Status (1 if married)	1278	0.6667	0.471589	0	1	1278	0.6815	0.466064	0	1
Household Size	1278	6.52	2.955288	1	21	1278	7.13	3.209127	1	23
Urban (1 if urban)	1278	0.4726	0.499445	0	1	1278	0.5524	0.497439	0	1
Food Expenditure Per capita	1278	1865624	3690589	0	116000000	1278	2533738	2315550	0	29300000
Non-food Expenditure Per capita	1278	5316166	30400000	1868	631000000	1266	3484852	9059817	0	157000000
Total Expenditure Per capita	1278	7181790	32800000	1868	746000000	1266	6011760	10100000	0	173000000

Source: IFLS wave 4 and wave 5

In total, there were 2,556 households in this study from IFLS waves 4 and 5. The author used panel data so the observations in 2007 totaled 1,278 households and in 2014 there were 1,278 households. The average total expenditure per capita in 2007 was IDR 7.1 million and the total expenditure in 2014 was IDR 6 million rupiah.

This research divided labor status into four categories by using the data taken from the IFLS wave 4 and wave 5 as panel data. Table 4 shows the descriptive statistics comparison of four categories. Labor Status 11 or the working group has the highest percentage with 66.12% of the total observation of 2,556 indicated by the median. The Labor Status 10 group was the group that worked in the first survey and then stated that they had retired in the second survey and it amounted to 14.95% of the total observations. The number of Labor Status 01 individuals, or the group that stated retirement in the first survey but decided to return to work by the next survey, had the lowest number of observations (9.31%). Meanwhile, for the Labor Status 00 group, those who were retired in both surveys, amounted to 9.62%. The number of observations for group Labor Status 11 was 845, the number of observations for Labor Status 10 accounted for 191 households, for Labor Status 01 there were 119 households, while in the Labor Status 00 group, there were 123 households.

Table 4. Descriptive Statistics for Categorical Samples

Variables	Mean	Std. Dev.	Min	Max
Labor Status11	66.12%	0.47	0	1
Labor Status10	14.95%	0.36	0	1
Labor Status01	9.31%	0.29	0	1
Labor Status00	9.62%	0.29	0	1
Total Obs.				**2,556**

Source: IFLS wave 4 and wave 5

3. Measures

Panel data was chosen because it provides superior information before and after policy implementation, in this case, retirement decisions. Previous studies have used panel data to investigate the pattern of retention consumption such as those by Aguila et al. (2011), Bonsang & van Soest (2020), Olafsson & Pagel (2020), Unnikrishnan & Imai (2020), Smed et al. (2022), Okamoto et al. (2022) in various developed and developing countries. To obtain the best model, the Chow and Hausman tests were used in estimating panel data. Fixed-effect models, random-effect models, and common-effect models are possible as panel methods. However, the panel had limitations from using individual characteristics and time-invariant between periods. To overcome this, the DiD method was used as an extension of the analysis.

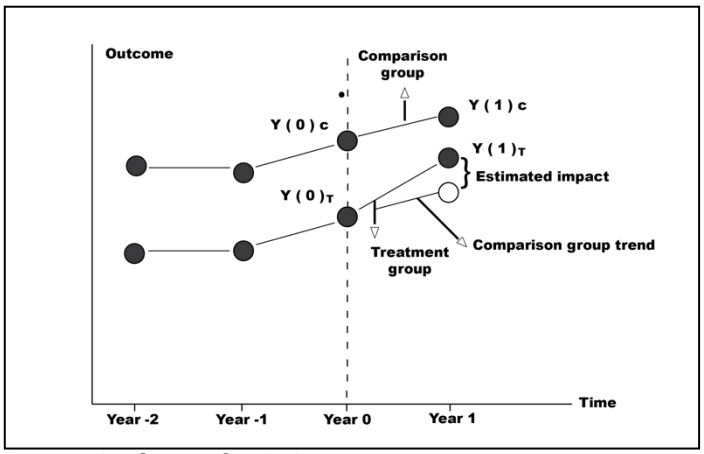
Therefore, the impact was analyzed using the DiD method having taken data from the Indonesia Family Life Survey (IFLS) waves 4 and 5. The DiD method is a method of comparing the change in results over time between the treatment and control groups (Gertler, 2016). An important point in estimating the impact of using DiD is the potential outcome of the treatment group if it does not get intervention (Y (0) T), whereas the counterfactual data will certainly never exist in the real world. DiD will make a valid comparison group as a substitute counterfactual by using the change in results in other groups who did not get the intervention during the same observation period.

Figure 3 illustrates the DiD impact analysis method. This figure shows that, if the treatment group was not treated, the outcomes between the treatment and control group were still going to be similar. In this case, the outcome of the treatment group before getting the intervention is represented by point (Y (0) T), while the outcome of the treatment group after receiving the intervention is represented by point (Y (1) T). Then, the outcome of the control group before getting the intervention was represented by point (Y (0) c), while the outcome of the control group. after receiving the intervention. was represented by point (Y (1) c).

However, the Difference in Difference (DiD) model can be written using the following equation:

$$Y_{it} = a_0 + a_1 Treatment_{it} + \beta_0 After_{it} + \beta_1 Treament_{it} * After_{it} + \mu_{it} \quad (6)$$

Figure 3. Difference in Difference Model



Source: Gertler *et al.*, 2016

In this equation, $Y_{it}$is the outcome of interest, $Treatment_{it}$is the intervention status that is equal to 1 if the observation detects an intervention. $After_{it}$is the time status which will be equal to 1 if the post-intervention observation is given. $Treatment_{it}$*. $After_{it}$is the interaction between whether the group receives the treatment and the time indicator. Khandker (2010) stated that the impact of the DiD analysis from the intervention can be seen from the interaction coefficient between the treatment variable and the time variable. The model can also be developed by adding control variables to the model, so it can be written in the equation (3.2)

$$Y_{it} = a_0 + a_1 Treatment_{it} + \beta_0 After_{it} + \beta_1 Treament_{it} * After_{it} + a_n C_{(n)it} + \mu_{it} \quad (7)$$

We can also see the DiD analysis using Table 3.1 where the impact of the intervention is shown in at the bottom of the fourth column.

The difference-in-differences method compares the changes in outcomes overtime between a population that is enrolled in a program and a population that is not enrolled in the program. Comparing the changes over time is needed since as shown in Table 1, if we only use the before and after as the control groups, before program implementation or, in this case, the labor status change, the average value of outcomes for the control group is a_0, and the average value of outcomes for the control group after the program implementation or status change is $a_0 + \beta_0$, meaning that if we draw the difference from before and after is β_0.

Nevertheless, if we only use the before and after as treatment groups, the average value of outcome for the treatment group before the labor status change is $a_0 + a_1$, that we got from the equation (6), since it is for the treatment group, the value of is equal to 1 and the value of after is equal to 0. The average outcome after the labor status change is $a_0 + \beta_0 + a_1 + \beta_1$because the value of treatment and after is equal to 1. So, the difference between before and after for the treatment group is $\beta_0 + \beta_1$. After getting some results from equation (6) above, we can conclude that the difference between the control groups and the comparison group across periods is β_1. By knowing this, we can find out the impact resulting from the change in labor status, which is, β_1. Even so, the impact of DiD can apply several regression models such as regression without control variables and regression with control variables.

The DiD model applied refers to the model which was developed by Aguila *et al.* (2011) as written in this equation:

$$ln\ C = \beta + I\alpha + G\gamma + T\theta + X\delta + u \quad (8)$$

Where:

ln C is the outcome interest or household consumption. β is the constant. I refers to the dummy variable for the survey period. G refers to a stacked matrix NT × k, and, where N is the number of observations, T the number of time periods, and k is the total number of variables. The matrix G in this case includes dummy variables for each group j of households which

Table 5. Difference-in-Differences (DiD)

	Before	After	After - Before
Control	a_0	$a_0 + \beta_0$	β_0
Treatment	$a_0 + a_1$	$a_0 + \beta_0 + a_1 + \beta_1$	$\beta_0 + \beta_1$
Difference	a_1	$a_1 + \beta_1$	β_1

Source: Khandker, 2010

are defined according to their labor status in the first survey (IFLS wave 4) and last survey (IFLS wave 5),meaning that there are four dummy variables for the labor status of the head of the household in this study; Labor Status 00 is a dummy variable for household heads who did not work in both the first and second surveys; Labor Status 01 is a dummy variable for the head of the household who did not work in the first survey (retired) and worked in the second survey; Labor Status 10 is a dummy variable for household heads who worked in the first interview and did not work (retired) in the second survey. This is a group of households that exit the labor market into the retirement phase. Labor Status 11 is a dummy variable for household heads who worked in both surveys. Labor Status11 group becomes the base group in the regression. Matrix T is the interaction between I x G, represents the marginal effect of consumption for each labor status group compared to the base group.

A matrix X of household demographic characteristics and time dummies was used as control variables. The demographic characteristics are head of household age, family size, a dummy for couples' households, location (urban/rural), head household education, pension fund ownership, province, ethnicity, and religion.

Previous research was polarized on the definition of retirement consumption. Particularly in terms of the food consumption variable, previous studies have only used the cost of food and nutrition as a proxy for reduced utility (Chen et al., 2017; Stephens Jr. & Toohey, 2018; Manajit et al., 2020; Smed et al., 2022). However, Aguila et al. (2011) not only used food consumption as a measure of consumption, but also nondurable consumption such as tobacco, alcohol, daily transportation costs, personal care products, tourism and recreation needs, and utility services. In this study, the selection of variables refers to Aguila et al. (2011) because it is more representative of real per capita consumption. The selection of the DiD method is also linear to see the impact before and after retirement, with relatively similar individual characteristics in the two groups.

4. Result

Table 6 shows the results using the difference-in-differences (DiD) method (see appendix 7). There are four estimations by comparing the labor status using Labor Status 11 as the base comparison. There is a significant difference between Labor Status 10 (household group who moves into retirement) in total expenditure is smaller by -19.9% compared to Labor Status 11 (still working in two periods), dominated by a decrease in non-food expenditure. However, in this group there is no significant difference in food expenditure that occurred which could then be explained by the increase in home production. The budget for non-food expenditures is 34.2% smaller for groups that are transitioning towards retirement (Labor10), compared to Labor11 (working on all period). This result is in line with the study of Smed, Ronnow, and Tetens (2022), who found that retirement does not reduce consumption ability because retired consumption is met from home cooking.

Table 6. Differences in Consumption Estimation in All Ages

Variable	All Ages		
	Total Expenditure Percapita	Food Expenditure Percapita	Non-food Expenditure Percapita
Labor Status10	-0.199*	-0.126	-0.342**
	(0.107)	(0.0866)	(0.141)
Labor Status01	-0.399***	-0.217*	-0.590***
	(0.136)	(0.125)	(0.171)
Labor Status00	-0.178	-0.0818	-0.183
	(0.144)	(0.129)	(0.179)
Observations	2,525	2,528	2,525

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

I is the dummy year that represents the survey period. Labor Status j are labor status categorizations that are obtained from the first and second survey. The comparison group is Labor Status11, those who are working. Group Labor Status 10 is households experiencing the transition from working to retirement. Group Labor Status01 is households which return to the labor market, while group Labor Status00 is households which are retired in both surveys. Control variables such as dummy year, age of head households, gender dummy, dummy ethnicity, dummy religion, education level, marital status, household size, and residential location are already included in this regression.

Source: IFLS 4 and 5, data processed

Meanwhile, for Labor Status 01, the household group that entered the labor market again experienced a decrease in total expenditure by 39.9%. This group also did experience a decrease in expenditure on food of 21.7% and a decrease of 59 % for non-food expenditure. Working status affects per capita household spending in Indonesia and the impact of reduced consumption ability is greater for the group that returns to the labor market. However, for the retired group in the two survey periods (Labor00) there is no significant decrease in all consumption puzzle measurements (Table 6) and, in line with Aguila et al. (2011) a significant effect on retirement consumption was not found.

Table 7 shows the difference in consumption based on labor status and age category to see at what age the decline in consumption began (see Appendix 9 and 10). For total expenditure, Labor Status 10 experiences a significant difference of 42.9% in the 70-79 age range compared to the Labor Status 11 group which was the basis for the regression. Meanwhile, for Labor Status 01 and Labor Status 00 there is no significant difference.

For the food expenditure, Labor Status 10 decreased by 68.2% at a significance level of 10% in the 80+ age group. However, for the Labor Status 01 and Labor Status 00 group a significant difference was not found. In the last expenditure category which is non-food expenditure, Labor Status 10 experienced a difference in expenditure of 60.4% at a significance level of 10%. Meanwhile, other age groups did not experience a significant difference in Labor Status 01 and Labor Status 00.

Table 7. Differences in Consumption Estimation Using Age Categories

		Total Expenditure Percapita		
Variable	Age 50-59	Age 60-69	Age 70-79	Age >80
I x Labor Status10	-0.194	-0.0554	-0.429*	-0.274
	(0.149)	(0.163)	(0.247)	(0.533)
I x Labor Status01	-0.362	0.0757	-0.288	-0.377
	(0.243)	(0.207)	(0.389)	(0.921)
I x Labor Status00	-0.128	0.123	-0.194	-1.550
	(0.315)	(0.157)	(0.288)	(1.353)
Observations	883	1,170	401	71
		Food Expenditure Percapita		
Variable	Age 50-59	Age 60-69	Age 70-79	Age >80
I x Labor Status10	-0.0524	-0.0890	-0.202	-0.682*
	(0.151)	(0.123)	(0.209)	(0.356)
I x Labor Status01	-0.0985	0.216	-0.255	-1.080
	(0.150)	(0.238)	(0.335)	(0.801)
I x Labor Status00	-0.134	0.0178	-0.158	0.258
	(0.257)	(0.154)	(0.258)	(0.729)
Observations	888	1,172	398	70
		Non-food Expenditure Percapita		
Variable	Age 50-59	Age 60-69	Age 70-79	Age >80
I x Labor Status10	-0.326	-0.209	-0.604*	-0.144
	(0.202)	(0.208)	(0.323)	(0.745)
I x Labor Status01	-0.490	-0.0428	-0.194	0.537
	(0.309)	(0.257)	(0.469)	(1.033)
I x Labor Status00	-0.181	0.125	-0.140	-1.189
	(0.463)	(0.189)	(0.376)	(1.508)
Observations	883	1,170	401	71

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Source: IFLS, data processed

I is the dummy year that represents the survey period. Labor Status j are labor status categorizations that are obtained from the first and second survey. The comparison group is Labor Status11, those who are working. Group Labor Status 10 is households experiencing the transition from working to retirement. Group Labor Status01 is households which return to the labor market, while group Labor Status00 is households which are retired in both surveys. Control variables such as dummy year, age of head households, gender dummy, dummy ethnicity, dummy religion, education level, marital status, household size, and residential location are already included in this regression.

Source: IFLS 4 and 5, data processed

A consistent result is also yielded by the Labor Status 00 group, a group that remains retired in both surveys, which shows that there is no significant difference for all types of expenditure across age categories. Nevertheless, this might be because of the culture of the elderly who still live with large families: about 62.64% of the elderly still live together with three generations (Susenas, 2017) and this greatly affects the amount spent on consumption since the data we use are at the household level and not the individual level.

From the differences in consumption estimation using age categories models, the results show that there is a consumption retirement puzzle, which is indicated by a decrease in total expenditure of 19.9% that is also caused by a decrease in non-food expenditure of 34.2%,

meaning that this study is in line with the findings of Banks (1998) and Bernheim (2001) that showed that there is a sharp decline in consumption when entering retirement which could jeopardize the life cycle hypothesis. However, the results of this study are inconsistent with previous studies in other countries presented by Battistin (2009), Aguila (2011), and Hongbin Li (2015), where they experienced decreases in food expenditure and mostly there was only a significant decrease in expenditure on non-food expenditure.

However, the estimation results for ages 70-79 are consistent where retirement has a negative impact on total expenditure and non-food expenditure. In the context of food expenditure, retirement has a negative impact after the age of 80 while for ages between 50-79,there is no impact. Based on this case, it is suspected that there is an influence of age on food expenditure due to health considerations as in the study by Smed, Ronnow, and Tetens (2022), and due to less income (Chen et al., 2017).

CONCLUSION AND SUGGESTION

This research intends to find out how changes in consumption are taking place among retirees in Indonesia. The main results show that there is a consumption retirement puzzle, which is indicated by a decrease in total expenditure and non-food expenditure. This negative effect of retirement is in line with the findings of Banks (1998) and Bernheim (2001) on consumption, Beblo and Schreiber (2021) on housing consumption as a part of non-food expenditure, and Redmood and McGuinness (2022) on household consumption outside the home especially for vacation expenditure.

Surprisingly, there was no significant effect on food expenditure so this study did not find a retirement food consumption puzzle in Indonesian households. This result is consistent with the estimation model that differentiates consumption by age category and in line with Smed, Ronnow, and Tetens (2022) who state that retirement in Danish households does not reduce consumption ability because retired consumption is met because of home cooking. However, the results of this study are inconsistent with previous studies in other countries presented by Battistin (2009), Aguila (2011), and Hongbin Li (2015), where households experienced decreases in food expenditure and there was only a significant decrease in expenditure on non-food expenditure.

Further research could expand the analysis by looking at savings and social insurance programs as well as others which also determine household consumption. In addition, the interval between the two surveys was seven years, so the authors cannot be certain about the state of consumption of retirees in their initial year of retirement to see the shock or the decline. The government prepares pension funds and creates a social security program to maintain the welfare of elderly people that can cater especially to the poor or elderly who have low income throughout their lives and elderly people who previously did not have a pension fund.

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APPENDIX

Appendix 1. Total Expenditure Percapita with and without control variables and without adjusted inflation (in all ages)

Variables	(1) Total Expenditure Percapita	(2) Total Expenditure Percapita	(3) Total Expenditure Percapita
Labor Status10	-0.229*	-0.219**	-0.218**
	(0.133)	(0.109)	(0.108)
Labor Status01	-0.112	-0.408***	-0.401***
	(0.150)	(0.137)	(0.136)
Labor Status00	-0.170	-0.166	-0.173
	(0.161)	(0.148)	(0.145)
DummyYear	0.430***	0.565***	0.557***
	(0.0464)	(0.0453)	(0.0441)
Status10	0.251***	0.127	0.125
	(0.0963)	(0.0830)	(0.0820)
Status01	0.154	0.355***	0.390***
	(0.117)	(0.112)	(0.110)
Status00	0.171	0.151	0.150
	(0.116)	(0.113)	(0.112)
Age of Head Household		-0.0141***	-0.0120***
		(0.00279)	(0.00275)
Ethnicity (1 if Javanese)		-0.0179	0.0694
		(0.0349)	(0.0466)
Gender (1 if male)		-0.126*	-0.112*
		(0.0663)	(0.0659)
Religion (1 if Islam)		-0.240***	-0.0991
		(0.0713)	(0.0799)
Education level		0.0740***	0.0724***
		(0.00414)	(0.00436)
Marriage Status (1 if married)		0.385***	0.415***
		(0.0624)	(0.0619)
HouseholdSize		-0.0727***	-0.0757***
		(0.00623)	(0.00619)
Urban (1 if urban)		0.189***	0.131***
		(0.0383)	(0.0403)
Province (1 if Jakarta)	√	√	√
Constant	14.73***	15.55***	15.72***
	(0.0343)	(0.195)	(0.204)
Observations	2,538	2,520	2,520
R-squared	0.035	0.282	0.314

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 2. Total Expenditure Percapita, Food Expenditure Percapita, Non-Food Expenditure Percapita without adjusted inflation (in all ages)

Variables	(1) Total Expenditure Per capita	(2) Food Expenditure Per capita	(3) Non-food Expenditure Per capita
Labor Status10	-0.218**	-0.126	-0.342**
	(0.108)	(0.0866)	(0.141)
Labor Status01	-0.401***	-0.217*	-0.590***
	(0.136)	(0.125)	(0.171)
Labor Status00	-0.173	-0.0818	-0.183
	(0.145)	(0.129)	(0.179)
DummyYear	0.557***	0.483***	0.656***
	(0.0441)	(0.0380)	(0.0583)
Status10	0.125	0.0465	0.208**
	(0.0820)	(0.0578)	(0.101)
Status01	0.390***	0.177*	0.550***
	(0.110)	(0.0918)	(0.138)
Status00	0.150	0.0395	0.234*
	(0.112)	(0.0913)	(0.142)
Age of Head Household	-0.0120***	-0.00477*	-0.0225***
	(0.00275)	(0.00246)	(0.00363)
Ethnicity (1 if Javanese)	0.0694	0.00736	0.173***
	(0.0466)	(0.0427)	(0.0608)
Gender (1 if male)	-0.112*	-0.0271	-0.187**
	(0.0659)	(0.0620)	(0.0869)
Religion (1 if Islam)	-0.0991	-0.00553	-0.171*
	(0.0799)	(0.0646)	(0.0958)
Education level	0.0724***	0.0432***	0.102***
	(0.00436)	(0.00356)	(0.00557)
Marriage Status (1 if married)	0.415***	0.333***	0.518***
	(0.0619)	(0.0603)	(0.0820)
HouseholdSize	-0.0757***	-0.0902***	-0.0497***
	(0.00619)	(0.00541)	(0.00788)
Urban (1 if urban)	0.131***	0.177***	0.131**
	(0.0403)	(0.0343)	(0.0516)
Province (1 if Jakarta)	√	√	√
Constant	15.72***	14.78***	15.06***
	(0.204)	(0.178)	(0.265)
Observations	2,520	2,528	2,525
R-squared	0.314	0.290	0.303

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 3. Total Expenditure Percapita with age category (without adjusted inflation)

	Total Expenditure Percapita			
Variables	Age 50-59	Age 60-69	Age 70-79	Age >80
Labor Status10	-0.176	-0.0930	-0.452*	-0.247
	(0.150)	(0.163)	(0.247)	(0.537)
Labor Status01	-0.361	0.0581	-0.237	-0.408
	(0.245)	(0.208)	(0.387)	(0.909)
Labor Status00	-0.130	0.147	-0.196	-1.543
	(0.319)	(0.158)	(0.292)	(1.362)
DummyYear	0.547***	0.461***	0.539***	0.463
	(0.0653)	(0.0900)	(0.168)	(0.431)
Status10	0.345***	0.0482	0.0978	0.548
	(0.112)	(0.131)	(0.187)	(0.470)
Status01	0.296	0.114	-0.0233	-0.479
	(0.199)	(0.188)	(0.307)	(0.683)
Status00	0.176	0.0524	0.0935	1.028
	(0.221)	(0.102)	(0.251)	(1.278)
Age of Head Household	0.00968	-0.00550	-0.0298*	0.0152
	(0.00706)	(0.00924)	(0.0178)	(0.0389)
Ethnicity (1 if Javanese)	0.116	0.0605	0.132	0.174
	(0.0746)	(0.0692)	(0.131)	(0.440)
Gender (1 if male)	-0.135	-0.130	-0.0840	0.0543
	(0.102)	(0.105)	(0.156)	(0.437)
Religion (1 if Islam)	-0.265*	-0.0249	-0.191	-0.0960
	(0.139)	(0.110)	(0.218)	(0.452)
Education level	0.0756***	0.0713***	0.0655***	-0.0244
	(0.00674)	(0.00683)	(0.0150)	(0.0515)
Marriage Status (1 if married)	0.326***	0.451***	0.441***	0.436
	(0.0991)	(0.0954)	(0.140)	(0.466)
HouseholdSize	-0.0877***	-0.0699***	-0.0850***	-0.0189
	(0.0102)	(0.00852)	(0.0188)	(0.0636)
Urban (1 if urban)	0.166***	0.160**	0.00565	0.747*
	(0.0545)	(0.0628)	(0.118)	(0.415)
Province (1 if Jakarta)	√	√	√	√
Constant	14.85***	15.19***	17.36***	12.78***
	(0.492)	(0.552)	(1.213)	(3.066)
Observations	881	1,167	401	71
R-squared	0.430	0.292	0.338	0.202

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 4. Food Expenditure Percapita in age categories (without adjusted inflation)

	Food Expenditure Percapita			
Variables	Age 50-59	Age 60-69	Age 70-79	Age >80
Labor Status10	-0.0524	-0.0890	-0.202	-0.682*
	(0.151)	(0.123)	(0.209)	(0.356)
Labor Status01	-0.0985	0.216	-0.255	-1.080
	(0.150)	(0.238)	(0.335)	(0.801)
Labor Status00	-0.134	0.0178	-0.158	0.258
	(0.257)	(0.154)	(0.258)	(0.729)
DummyYear	0.444***	0.460***	0.441***	0.378
	(0.0570)	(0.0785)	(0.164)	(0.345)
Status10	0.254**	0.0281	-0.0768	0.846***
	(0.103)	(0.0856)	(0.133)	(0.279)
Status01	0.0719	-0.126	0.0330	0.391
	(0.108)	(0.197)	(0.244)	(0.428)
Status00	-0.0541	0.131	-0.0306	-0.441
	(0.191)	(0.105)	(0.196)	(0.570)
Age of Head Household	0.0116**	-0.00673	-0.00544	0.0512
	(0.00493)	(0.00848)	(0.0170)	(0.0325)
Ethnicity (1 if Javanese)	0.00145	0.0266	0.0958	0.200
	(0.0644)	(0.0636)	(0.128)	(0.311)
Gender (1 if male)	0.00461	-0.0794	-0.0770	0.375
	(0.0931)	(0.0973)	(0.158)	(0.290)
Religion (1 if Islam)	-0.0886	0.00971	-0.0776	0.0357
	(0.0957)	(0.0945)	(0.191)	(0.352)
Education level	0.0413***	0.0423***	0.0449***	-0.0121
	(0.00524)	(0.00544)	(0.0144)	(0.0343)
Marriage Status (1 if married)	0.184**	0.397***	0.419***	0.743**
	(0.0933)	(0.0906)	(0.146)	(0.313)
HouseholdSize	-0.0971***	-0.0872***	-0.102***	-0.107**
	(0.00897)	(0.00742)	(0.0168)	(0.0495)
Urban (1 if urban)	0.198***	0.206***	0.0298	0.699***
	(0.0505)	(0.0523)	(0.107)	(0.259)
Province (1 if Jakarta)	√	√	√	√
Constant	14.14***	14.78***	15.27***	9.602***
	(0.338)	(0.511)	(1.146)	(2.373)
Observations	888	1,172	398	70
R-squared	0.349	0.288	0.332	0.602

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 5. Non-Food Expenditure Percapita (without adjusted inflation)

	Non-food Expenditure Per capita			
Variables	Age 50-59	Age 60-69	Age 70-79	Age >80
Labor Status10	-0.326	-0.209	-0.604*	-0.144
	(0.202)	(0.208)	(0.323)	(0.745)
Labor Status01	-0.490	-0.0428	-0.194	0.537
	(0.309)	(0.257)	(0.469)	(1.033)
Labor Status00	-0.181	0.125	-0.140	-1.189
	(0.463)	(0.189)	(0.376)	(1.508)
DummyYear	0.561***	0.605***	0.498**	0.527
	(0.0872)	(0.123)	(0.214)	(0.507)
Status10	0.422***	0.183	0.152	0.135
	(0.152)	(0.157)	(0.229)	(0.635)
Status01	0.368	0.205	-0.0737	-1.227
	(0.248)	(0.211)	(0.396)	(0.918)
Status00	0.371	0.142	0.0413	0.910
	(0.303)	(0.123)	(0.332)	(1.506)
Age of Head Household	0.0150*	-0.0180	-0.0338*	0.00240
	(0.00909)	(0.0126)	(0.0201)	(0.0458)
Ethnicity (1 if Javanese)	0.255**	0.119	0.272	0.615
	(0.100)	(0.0882)	(0.172)	(0.667)
Gender (1 if male)	-0.229*	-0.0921	-0.154	-0.677
	(0.135)	(0.136)	(0.214)	(0.550)
Religion (1 if Islam)	-0.308*	-0.0335	-0.540**	-0.106
	(0.173)	(0.137)	(0.249)	(0.594)
Education level	0.102***	0.0983***	0.0970***	0.0669
	(0.00870)	(0.00847)	(0.0202)	(0.0612)
Marriage Status (1 if married)	0.498***	0.450***	0.511***	0.646
	(0.132)	(0.123)	(0.196)	(0.583)
HouseholdSize	-0.0760***	-0.0430***	-0.0495**	0.0782
	(0.0130)	(0.0109)	(0.0230)	(0.0829)
Urban (1 if urban)	0.163**	0.153**	0.140	0.253
	(0.0719)	(0.0778)	(0.157)	(0.463)
Province (1 if Jakarta)	√	√	√	√
Constant	13.41***	14.56***	16.46***	11.78***
	(0.626)	(0.747)	(1.396)	(3.612)
Observations	883	1,170	401	71
R-squared	0.385	0.274	0.341	0.265

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 6. Total Expenditure Percapita with and without control variables and with adjusted inflation (in all ages)

Variables	(1) Total Expenditure Percapita	(2) Total Expenditure Percapita	(3) Total Expenditure Percapita
Labor Status10	-0.209	-0.197*	-0.199*
	(0.133)	(0.110)	(0.107)
Labor Status01	-0.110	-0.406***	-0.399***
	(0.150)	(0.136)	(0.136)
Labor Status00	-0.176	-0.172	-0.178
	(0.159)	(0.146)	(0.144)
DummyYear	0.409***	0.542***	0.533***
	(0.0459)	(0.0450)	(0.0438)
Status10	0.240**	0.118	0.115
	(0.0954)	(0.0819)	(0.0807)
Status01	0.145	0.347***	0.384***
	(0.116)	(0.110)	(0.109)
Status00	0.169	0.152	0.152
	(0.115)	(0.112)	(0.111)
Age of Head Household		-0.0142***	-0.0121***
		(0.00276)	(0.00273)
Ethnicity (1 if Javanese)		-0.0234	0.0703
		(0.0348)	(0.0464)
Gender (1 if male)		-0.114*	-0.0991
		(0.0660)	(0.0659)
Religion (1 if Islam)		-0.244***	-0.0999
		(0.0708)	(0.0792)
Education level		0.0722***	0.0710***
		(0.00411)	(0.00432)
Marriage Status (1 if married)		0.384***	0.413***
		(0.0621)	(0.0618)
HouseholdSize		-0.0717***	-0.0750***
		(0.00621)	(0.00617)
Urban (1 if urban)		0.198***	0.139***
		(0.0381)	(0.0400)
Province (1 if Jakarta)	√	√	√
Constant	14.69***	15.51***	15.68***
	(0.0339)	(0.193)	(0.202)
Observations	2,543	2,525	2,525
R-squared	0.032	0.279	0.312

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 7. Total Expenditure Percapita, Food Expenditure Percapita, Non-Food Expenditure Percapita with adjusted inflation (in all ages)

Variables	(1) Total Expenditure Per capita	(2) Food Expenditure Per capita	(3) Non-food Expenditure Per capita
Labor Status10	-0.199*	-0.126	-0.342**
	(0.107)	(0.0866)	(0.141)
Labor Status01	-0.399***	-0.217*	-0.590***
	(0.136)	(0.125)	(0.171)
Labor Status00	-0.178	-0.0818	-0.183
	(0.144)	(0.129)	(0.179)
DummyYear	0.533***	0.464***	0.637***
	(0.0438)	(0.0380)	(0.0583)
Status10	0.115	0.0465	0.208**
	(0.0807)	(0.0578)	(0.101)
Status01	0.384***	0.177*	0.550***
	(0.109)	(0.0918)	(0.138)
Status00	0.152	0.0395	0.234*
	(0.111)	(0.0913)	(0.142)
Age of Head Household	-0.0121***	-0.00477*	-0.0225***
	(0.00273)	(0.00246)	(0.00363)
Ethnicity (1 if Javanese)	0.0703	0.00736	0.173***
	(0.0464)	(0.0427)	(0.0608)
Gender (1 if male)	-0.0991	-0.0271	-0.187**
	(0.0659)	(0.0620)	(0.0869)
Religion (1 if Islam)	-0.0999	-0.00553	-0.171*
	(0.0792)	(0.0646)	(0.0958)
Education level	0.0710***	0.0432***	0.102***
	(0.00432)	(0.00356)	(0.00557)
Marriage Status (1 if married)	0.413***	0.333***	0.518***
	(0.0618)	(0.0603)	(0.0820)
HouseholdSize	-0.0750***	-0.0902***	-0.0497***
	(0.00617)	(0.00541)	(0.00788)
Urban (1 if urban)	0.139***	0.177***	0.131**
	(0.0400)	(0.0343)	(0.0516)
Province (1 if Jakarta)	√	√	√
Constant	15.68***	14.71***	14.99***
	(0.202)	(0.178)	(0.265)
Observations	2,525	2,528	2,525
R-squared	0.312	0.287	0.301

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 8. Total Expenditure Percapita with age category (with adjusted inflation)

	Total Expenditure Percapita			
Variables	Age 50-59	Age 60-69	Age 70-79	Age >80
Labor Status10	-0.194	-0.0554	-0.429*	-0.274
	(0.149)	(0.163)	(0.247)	(0.533)
Labor Status01	-0.362	0.0757	-0.288	-0.377
	(0.243)	(0.207)	(0.389)	(0.921)
Labor Status00	-0.128	0.123	-0.194	-1.550
	(0.315)	(0.157)	(0.288)	(1.353)
DummyYear	0.527***	0.434***	0.514***	0.479
	(0.0647)	(0.0890)	(0.166)	(0.432)
Status10	0.343***	0.0502	0.0433	0.528
	(0.111)	(0.130)	(0.178)	(0.468)
Status01	0.300	0.0962	-0.0139	-0.502
	(0.197)	(0.184)	(0.304)	(0.681)
Status00	0.180	0.0628	0.0809	1.021
	(0.218)	(0.101)	(0.248)	(1.266)
Age of Head Household	0.00905	-0.00576	-0.0283	0.0102
	(0.00699)	(0.00917)	(0.0177)	(0.0392)
Ethnicity (1 if Javanese)	0.116	0.0605	0.143	0.167
	(0.0739)	(0.0689)	(0.131)	(0.435)
Gender (1 if male)	-0.133	-0.108	-0.0715	0.103
	(0.101)	(0.107)	(0.156)	(0.434)
Religion (1 if Islam)	-0.268*	-0.0227	-0.197	-0.0615
	(0.137)	(0.108)	(0.219)	(0.455)
Education level	0.0747***	0.0688***	0.0639***	-0.0252
	(0.00665)	(0.00678)	(0.0148)	(0.0514)
Marriage Status (1 if married)	0.320***	0.446***	0.443***	0.418
	(0.0978)	(0.0959)	(0.140)	(0.462)
HouseholdSize	-0.0867***	-0.0688***	-0.0850***	-0.0188
	(0.0101)	(0.00848)	(0.0188)	(0.0634)
Urban (1 if urban)	0.174***	0.167***	0.0288	0.736*
	(0.0541)	(0.0624)	(0.117)	(0.415)
Province (1 if Jakarta)	√	√	√	√
Constant	14.84***	15.15***	17.23***	13.10***
	(0.486)	(0.548)	(1.200)	(3.076)
Observations	883	1,170	401	71
R-squared	0.427	0.288	0.342	0.202

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 9. Food Expenditure Percapita in age categories (with adjusted inflation)

	Food Expenditure Percapita			
Variables	Age 50-59	Age 60-69	Age 70-79	Age >80
Labor Status10	-0.0524	-0.0890	-0.202	-0.682*
	(0.151)	(0.123)	(0.209)	(0.356)
Labor Status01	-0.0985	0.216	-0.255	-1.080
	(0.150)	(0.238)	(0.335)	(0.801)
Labor Status00	-0.134	0.0178	-0.158	0.258
	(0.257)	(0.154)	(0.258)	(0.729)
DummyYear	0.425***	0.440***	0.422**	0.359
	(0.0570)	(0.0785)	(0.164)	(0.345)
Status10	0.254**	0.0281	-0.0768	0.846***
	(0.103)	(0.0856)	(0.133)	(0.279)
Status01	0.0719	-0.126	0.0330	0.391
	(0.108)	(0.197)	(0.244)	(0.428)
Status00	-0.0541	0.131	-0.0306	-0.441
	(0.191)	(0.105)	(0.196)	(0.570)
Age of Head Household	0.0116**	-0.00673	-0.00544	0.0512
	(0.00493)	(0.00848)	(0.0170)	(0.0325)
Ethnicity (1 if Javanese)	0.00145	0.0266	0.0958	0.200
	(0.0644)	(0.0636)	(0.128)	(0.311)
Gender (1 if male)	0.00461	-0.0794	-0.0770	0.375
	(0.0931)	(0.0973)	(0.158)	(0.290)
Religion (1 if Islam)	-0.0886	0.00970	-0.0776	0.0357
	(0.0957)	(0.0945)	(0.191)	(0.352)
Education level	0.0413***	0.0423***	0.0449***	-0.0121
	(0.00524)	(0.00544)	(0.0144)	(0.0343)
Marriage Status (1 if married)	0.184**	0.397***	0.419***	0.743**
	(0.0933)	(0.0906)	(0.146)	(0.313)
HouseholdSize	-0.0971***	-0.0872***	-0.102***	-0.107**
	(0.00897)	(0.00742)	(0.0168)	(0.0495)
Urban (1 if urban)	0.198***	0.206***	0.0298	0.699***
	(0.0505)	(0.0523)	(0.107)	(0.259)
Province (1 if Jakarta)	√	√	√	√
	(0.121)	(0.130)	(0.312)	(0.562)
Constant	14.07***	14.71***	15.20***	9.534***
	(0.338)	(0.511)	(1.146)	(2.373)
Observations	888	1,172	398	70
R-squared	0.345	0.285	0.331	0.600

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.

Appendix 10. Non-Food Expenditure Percapita in age categories (without adjusted inflation)

	Non-food Expenditure Percapita			
Variables	Age 50-59	Age 60-69	Age 70-79	Age >80
Labor Status10	-0.326	-0.209	-0.604*	-0.144
	(0.202)	(0.208)	(0.323)	(0.745)
Labor Status01	-0.490	-0.0428	-0.194	0.537
	(0.309)	(0.257)	(0.469)	(1.033)
Labor Status00	-0.181	0.125	-0.140	-1.189
	(0.463)	(0.189)	(0.376)	(1.508)
DummyYear	0.542***	0.586***	0.478**	0.508
	(0.0872)	(0.123)	(0.214)	(0.507)
Status10	0.422***	0.183	0.152	0.135
	(0.152)	(0.157)	(0.229)	(0.635)
Status01	0.368	0.205	-0.0737	-1.227
	(0.248)	(0.211)	(0.396)	(0.918)
Status00	0.371	0.142	0.0413	0.910
	(0.303)	(0.123)	(0.332)	(1.506)
Age of Head Household	0.0150*	-0.0180	-0.0338*	0.00240
	(0.00909)	(0.0126)	(0.0201)	(0.0458)
Ethnicity (1 if Javanese)	0.255**	0.119	0.272	0.615
	(0.100)	(0.0882)	(0.172)	(0.667)
Gender (1 if male)	-0.229*	-0.0921	-0.154	-0.677
	(0.135)	(0.136)	(0.214)	(0.550)
Religion (1 if Islam)	-0.308*	-0.0335	-0.540**	-0.106
	(0.173)	(0.137)	(0.249)	(0.594)
Education level	0.102***	0.0983***	0.0970***	0.0669
	(0.00870)	(0.00847)	(0.0202)	(0.0612)
Marriage Status (1 if married)	0.498***	0.450***	0.511***	0.646
	(0.132)	(0.123)	(0.196)	(0.583)
HouseholdSize	-0.0760***	-0.0430***	-0.0495**	0.0782
	(0.0130)	(0.0109)	(0.0230)	(0.0829)
Urban (1 if urban)	0.163**	0.153**	0.140	0.253
	(0.0719)	(0.0778)	(0.157)	(0.463)
Province (1 if Jakarta)	√	√	√	√
Constant	13.34***	14.50***	16.39***	11.71***
	(0.626)	(0.747)	(1.396)	(3.612)
Observations	883	1,170	401	71
R-squared	0.383	0.272	0.341	0.264

Notes: Standard errors are in parentheses * p<0.10, ** p<0.05, *** p<0.01.