AGING AND EMPLOYMENT:
A STUDY ON THE LABOR FORCE PARTICIPATION DECISION OF THE ELDERLY IN TURKEY

İSMAIL ŞENTÜRK[1]

ABSTRACT
In this study, it has been tried to determine the factors that affect the labor force participation decision of individuals between the ages of 55-64 in Turkey. In accordance with this purpose, analysis was carried out with the Logit method using the 2017 Household Labor Force Survey data obtained by the Turkish Statistical Institute. According to the findings, it was determined that the variables of education, retirement, gender, age, and marital status were effective on the decision to participate in the labor force for elderly individuals. It has been observed that the effect of having a university or higher education is particularly striking. Another important finding is that most retired individuals have moved away from the labor market. In addition, it has been observed that the probability of women's leaving the workforce is higher than that of men. Policy recommendations have been developed to increase the education level of individuals, to discourage early retirement, and to ensure women's participation in the workforce.

Keywords: Elderly workforce, Labor Force Participation, Turkey, Logit
JEL Codes: J60, J82

I. INTRODUCTION

One of the common demographic events in both developed and underdeveloped countries around the world is the aging of the population. The easier access of people to health services and the decrease in birth rates as a result of the rise in women's participation in the labor force can be counted among the reasons that augment the elderly population. In addition, it can be said that the rapid aging of the world population will cause significant changes in the global economy and have profound effects on labor markets (Chand & Tung, 2014).

The world population is driven by two trends. The first is the increase in life expectancy (Kulik et al., 2014). For example, approximately 10 million people in the United States are over the age of 65. It is estimated that this number will reach 19 million by 2050 (Cracknell, 2010). The increase in life expectancy with the decline of infectious diseases globally brings with it a decrease in deaths and a trend towards a healthier lifestyle. Another trend is the decrease in fertility rates with the increase in education level. These have brought about an increase in the elderly population (United Nations [UN], 2013). In the 2013 report of the UN, it was stated that the total fertility rate of the world decreased from 5 children per woman to 2.5 children per woman between 1950-1955, and today it has almost halved. In the continuation of the same report, it is emphasized that the number of elderly people will increase globally, and even more than 2 billion in 2050 by 2050. The global share of people aged 60 and over is expected to increase from 9.2% in 1990 to 11.7% in 2013 and to 21.1% by 2050 (UN, 2013). The aging of the population will bring some changes to it.

Aging also refers to a change that occurs in both the physiology and psychology of a person as he gets older. In the science of gerontology, aging is defined as "regular changes that occur in the living organism or adult human under environmental conditions with the progression of chronological age" (Baybora, 2007). Aging is an inevitable process that brings changes in the mental functions, psychology, and daily social life of the individual. It is seen that the capacity to work and do work decreases depending on age. Aging can cause difficulties in adapting to different situations by causing changes in functions and behaviors (Demirbilek, 2005).

The definition of old age differs according to country, culture, and time. As a result of decreasing birth rates, changing living conditions, and developing health sector, the average human lifespan has increased. There are many definitions of the concept of the elderly in the literature. According to the classification of the World Health Organization (WHO) (2002); Adolescents between the ages of 0-18, young people between the ages of 18-65,

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[1] Department of Economics, Tokat Gaziosmanpasa University, Turkey

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young-old between the ages of 65-74, old people between the ages of 74-84 and over 84 are considered very old. Although various classifications and different age criteria are used, the WHO definition of old age is taken as a basis, in general, old age studies. Accordingly, old age is defined as the gradual decrease in the ability to adapt to the environment.

While the UN refers to those aged 60 and over in the definition of the elderly population (UN, 2013), the OECD considers those 65 and over as the elderly population. Although there are different definitions of old age, there is no general acceptance of the age limit at which an individual will be considered old. To determine this age limit, chronological age, which is based on the person's chronological age and is associated with decreased skill, or functional age, which indicates the performance of the individual, is used (Koolhaas et al., 2012).

It can be said that there are different opinions about the concept of elderly employees. It is seen that a wide age range such as 45-65 years is mentioned. While the U.S. Department of Labor considers those above 55 years of age to be elderly, in the US employment age discrimination law in 1967, it is seen that the old age limit is reduced to 40 years. While defining the age, the upper limit is accepted as the retirement age specified in the social security system of each country (Stein and Rocco, 2001; Pitt-Catsouphes and Smyer, 2006; WHO, 2018). Mostly, researchers accept 55 or 65 years as a threshold (Rupp et al., 2005). However, it is sometimes seen that this threshold value is considered 45 (Pitt-Catsouphes and Smyer, 2006).

Along with the improvement in life expectancy, changes have occurred in the concept of the elderly. As the perception of the elderly and aging has changed, the proportion of workers aged 45-64 in the workforce has also increased. However, it is still seen that only 3 out of 10 people aged 60-64 are employed in EU countries (European Foundation for the Improvement of Living and Working Conditions, 2012). The time to quit working is affected by the expectations of society and the cultural norms of everyone (MacDermott, 2014).

Demographic changes appear to have significant effects on labor supply. When a change occurs in the demographic structure, the employment structure and the state of the labor market also change. The aging of the population, both in developed countries and in other countries, means an increase in the proportion of the elderly workforce in the workforce. Although older workers tend to have lower unemployment rates than those in the general population, the duration of unemployment has significant effects (Rones, 1983). Although significant improvements are detected in the employment rates and labor force participation of the elderly in the Turkish labor market, these levels are not satisfying (Usta and Murat, 2017). There are also opinions that as a result of increasing the education level and developing lifelong learning programs, the participation of the elderly in the workforce will increase in Turkey, along with the implementation of public subsidies that increase the employment opportunities of the elderly, and the encouragement of part-time and remote work will be effective (Günaydın, 2018).

This study aims to determine the factors that affect the labor force participation of elderly individuals in Turkey. Among the major problems of Turkey, there are social security deficits. These deficits arise because the number of individuals employed and paying premiums is low, while the number of individuals benefiting from social security services is much higher than this. The aging of the population in Turkey reduces the labor supply and causes problems in financing the social security system (Yasim, 2019). Therefore, it is necessary to extend the period of stay of the elderly in the labor market. The increase in the elderly population reduces the working-age population and puts pressure on national pensions, social security, health care, and aged care systems (MacDermott, 2014). The fact that individuals are not in the labor market at the age when they are still productive deepens the problem. For these reasons, it is important to reveal the factors that will enable or prevent the elderly population to be included in the workforce.

In the next sections of the study, the data used in the analysis will be introduced respectively. Afterward, the analysis method will be explained. The study will be completed with the presentation of the findings of the analysis and then the conclusion and recommendations sections.

II. DATA AND METHOD
II.I. DATA
Household Labor Force Survey data from the Turkish Statistical Institute were used in the study. The data set in question contains data for approximately 378 thousand individuals for 2017. However, when only 55-64 individuals were examined in accordance with the purpose of the study, the number of observations was 52,643. Thus, appropriate data can be used to determine whether individuals who are elderly in the labor market are included in the labor force. In Table 1, descriptive statistics including the mean and standard deviations of the variables used in the analysis are presented.

Table 1. Descriptive statistics of the variables used in the analysis

Variable	Description	Mean	St. Dev.
LFP	Labor force participation (1=in the labor force, 0=not in the labor force)	0.385	0.487
Illiterate	Education level (1=not literate, 0=other)	0.157	0.364
Literate	Education level (1=literate, 0=other)	0.066	0.249
Primary education	Education level (1=primary education, 0=other)	0.590	0.492
High school	Education level (1=high school, 0=other)	0.109	0.311
University	Education level (1=university, 0=other)	0.071	0.258
Master or PhD	Education level (1=master or doctorate, 0=other)	0.006	0.075
Retired	Retirement status (1=retired, 0=not retired)	0.222	0.416
Gender	Gender (1=female, 0=male)	0.512	0.500
Age	Individual's age	59.249	2.859
Marital status	Individual's marital status (1=married, 0=other)	0.860	0.348

According to Table 1, 38.5% of individuals between the ages of 55-64 are in the workforce. This rate is lower than in other age groups. Besides, 15.7% of these individuals in this age group are illiterate and this can be considered a very high rate. The rate of those who have not received a diploma from any educational institution but are literate is 6.6%. Primary school graduates, on the other hand, have a very high rate of 59%. High school graduates are 10.9%, university graduates are 7.1%, and graduates or doctoral graduates are 0.6%.

The rate of retirees is 22.2%. This ratio shows that individuals prefer to retire at an early age significantly. 51.2% of individuals are women. While the average age is about 59, it is seen that 86% of the population consists of married people.

II.II. METHOD

Individuals have two options: to be included in the labor market or not. In cases where there are two options and the individual chooses one of these options, the dependent variable can only take two values. Such cases where the dependent variable is a dummy variable can be expressed as:

$$y = \begin{cases} 1 & \text{with probability } p \\ 0 & \text{with probability } 1-p \end{cases} \tag{1}$$

If the cumulative distribution of the error term, u_i, is logistic, then the Logit method is used. (Cameron ve Trivedi, 2005: 469).

$$p = \Lambda(\mathbf{x}'\beta) = \frac{e^{\mathbf{x}'\beta}}{1 + e^{\mathbf{x}'\beta}} \tag{2}$$

Here $\Lambda(.)$ is the logistic cumulative distribution function. The maximum likelihood first order conditions of the Logit method would be:

$$\sum_{i=1}^{N} (y_i - \Lambda(\mathbf{x}_i'\beta))\mathbf{x}_i = \mathbf{0} \tag{3}$$

If there is a constant term among the independent variables, then equation 3 will be as follows, ensuring that the sum of the Logit residues is zero (Cameron and Trivedi, 2005: 469):

$$\sum_{i=1}^{N} (y_i - \Lambda(\mathbf{x}_i'\hat{\beta})) = \mathbf{0} \tag{4}$$

The marginal effects are as follows:

$$\frac{\partial p_i}{\partial x_{ij}} = p_i(1 - p_i)\beta_j \tag{5}$$

Equation 5 is one of two methods available for calculating marginal effects. This is the calculation of the marginal effect on the mean of each independent variable. Two problems arise for marginal effects if this method is used. First, this method gives the marginal effect for only one value of the independent variable. The second is the calculation of the marginal effect for a value between 0 and 1 when the mean of the dummy variables can only take 0 and 1 values, and for an individual that does not exist (Williams, 2012: 327). The other method is to find the marginal effects for each value of the independent variable and average them. Thus, the problems caused by the first method can be avoided. In this study, the second method of calculating the average marginal effects was used. The average marginal effects (AME) are calculated as follows:

$$AME(x_i) = \frac{1}{n}\sum_{i=1}^{n} p_i(1 - p_i)\beta_j \tag{5}$$

III. FINDINGS

The dependent variable used in the study is the labor force participation decision of individuals. Since this variable can take two values, the Logit method was used in the analysis. Table 2 contains the findings obtained with the Logit method. According to the findings, the coefficients of all the independent variables used were found to be significant. Since illiteracy is taken as the base category among the variables related to education, the interpretation of the coefficients of the other variables should be made according to this variable. Obtaining positive coefficients for all variables related to education indicates that individuals with other education levels are more likely to participate in the labor force than those who are illiterate. Retired people were found to be less likely to join the workforce than non-retired people. Similarly, women are less likely to join the workforce than men. It has been determined that the increase in age reduces the probability of joining the workforce. In addition, it has been found that married individuals are more likely to be included in the workforce than other individuals.

Table 2. Logit method findings

	Coefficient	St. error	t value	p-value
Literate	0.157*	0.050	3.13	0.002
Primary education	0.092*	0.033	2.76	0.006
High school	0.250*	0.054	4.62	0.000
University	1.415*	0.080	17.71	0.000
Master or PhD	3.069*	0.260	11.79	0.000
Retired	-6.642*	0.115	-57.59	0.000
Gender	-2.686*	0.028	-95.89	0.000
Age	-0.052*	0.004	-11.74	0.000
Marital status	0.625*	0.037	16.94	0.000
Constant	3.991*	0.271	14.75	0.000

*, ** and *** indicate that the coefficients are statistically significant at 1%, 5%, and 10% significance levels, respectively.

In the logit method, it is important to obtain marginal effects because only the signs of the coefficients can be interpreted, and the size of the coefficients does not give information about the size of the effect. By using the marginal effects, the magnitude of the effect of each variable on the probability of joining the labor force can be understood. Table 3 shows the marginal effects obtained after the Logit method. The resulting marginal effects are the average of the marginal effects calculated for all values taken by each independent variable.

Those who are literate and have not graduated from any school are 1.9% more likely to join the workforce than those who are illiterate. This rate is 1.1% for primary school graduates, 3.1% for high school graduates, 17.6% for university graduates, and 38.2% for graduate or doctorate graduates. According to this finding, it is seen that the increase in the level of education increases the probability of joining the labor force. Retired individuals are 82.6% less likely to join the workforce than non-retired individuals. This finding shows how repellent the early retirement for elderly individuals when it comes to the labor force. It has been determined that the labor force participation rate of women is 33.4% lower than that of men. It is seen that a one-unit increase in age causes a 0.6% decrease in the probability of joining the labor force. Married individuals are 7.8% more likely to join the workforce than unmarried individuals.

Table 3. Marginal effects

	dy/dx	Standard error	t value	p value
Literate	0.019*	0.006	3.130	0.002
Primary education	0.011*	0.004	2.760	0.006
High school	0.031*	0.007	4.620	0.000
University	0.176*	0.010	17.840	0.000
Master or PhD	0.382*	0.032	11.820	0.000
Retired	-0.826*	0.014	-60.790	0.000
Gender	-0.334*	0.002	-181.220	0.000
Age	-0.006*	0.001	-11.780	0.000
Marital status	0.078*	0.005	17.060	0.000

*, ** and *** indicate that the marginal effects are statistically significant at the 1%, 5%, and 10% significance levels, respectively.

IV. CONCLUSION AND POLICY RECOMMENDATIONS

In this study, the decision of elderly individuals to join the workforce in Turkey was examined. The findings show that education has a very important effect on this decision. The fact that individuals with university or higher education are particularly likely to be included in the workforce emphasizes the importance of education. It can be argued that individuals with low education levels are obliged to withdraw from the labor market as they get older.

It may be beneficial to try to increase the level of education so that society can benefit from these individuals for a longer time and more efficiently. In addition, since a similar situation may be encountered in the next generations, it may be necessary to make more efforts to increase the education level of the whole society. Early retirement is one of the important problems in Turkey. The findings of the study support this claim. The retirement of those aged 55-64 and so their withdrawal from the labor force causes these individuals to move away from production and has a negative impact on the social security system. This problem caused by early retirement should be prevented. For individuals not to retire early, they can be supported to stay in the workforce with tax deductions when they reach this age. In addition, pensions can be increased to encourage them to retire later. The fact that women are much less likely to be included in the workforce than men can be seen as an indicator that women move away from the workforce as they get older. Low female labor force participation in Turkey is not a problem specific to the 55-64 age group. Since women's participation in the workforce is generally low, vocational training courses for women can increase their chances of being included in the workforce. The increase in the age of individuals has a small and negative effect on the probability of participating in the labor force. This is an expected situation. In order to prevent this, it can be ensured that individuals are subjected to lower tax rates as they get older. Thus, staying in the labor force and at the same time participating in the labor force can be encouraged. Marriage brings additional responsibilities to individuals. Due to these responsibilities, it is not surprising that married individuals are more likely to be included in the workforce.

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