

Research Paper**Analysis and Comparison of Aging Population in Europe and Asia During 1950 to 2015*****Saadallah Darabi¹, Fatemeh Torabi¹**

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ABSTRACT

Objectives The study aimed at performing a comparative analysis of the aging population in European and Asian countries during 1950 and 2015.

Methods & Materials This study has been conducted through a secondary analysis, and the data for 90 European and Asian countries were derived from the UN Population division. The used statistical method was history of survival analysis. The statistical package of Stata was used to perform statistical analyses of non-parametric methods of estimation of Kaplan-Meier and Nelson – Ellen’s survival function, and Cox’s semi-parametric proportional hazard model.

Results The study estimates showed that total fertility rates and life expectancy in both Europe and Asia were convergent in nature. The probability of occurrence of aging has a negative relationship with total fertility rate and a positive relationship with life expectancy. Estimation of survival function and cumulative hazard function for the two study areas in 2015 indicated that probability of occurrence of aging was significantly different. Survival function of aging was close to zero for European countries. This means that most European countries have entered the aging process while the likely to survive an accident for Asian countries was more than 0.75.

Conclusion According to the results, during 1950 to 2015, the percentages of aging populations in all regions of the European continent was dramatically higher than that of the Asian countries. In recent decades, although there has been a rapid fall in fertility rate and increased life expectancy among the less developed Asian countries, the process of population aging has increased. This index in Asian countries is believed to outpace the European countries by 2050.

Key words:

Population aging,
Life expectancy,
Total fertility rate,
History survival
analysis

Extended Abstract**1. Objectives**

Currently, due to changes introduced in the age structure of the population in many countries, it seems necessary to investigate the population aging phenomenon in order for planners to pay more attention to the trend as well as the positive and

negative consequences of aging. Therefore, the aim of this study was to review and compare the process of population aging in European and Asian countries during 1950 to 2015. This study is significant as it involves the comparison of the aging process in Europe and Asia while recognizing the change in age structure among the countries of these continents. This study also evaluates the time of arrival and the time spent at different stages of demographic transition from youth to old age. Also, considering that demographic tran-

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sition in Europe has started earlier than most Asian countries, achieving a clear vision about the future of the aging population in Asian countries is important, which is based on the experience gained from the process of demographic transition and aging population in the European countries.

2. Methods & Materials

This study is a secondary analysis, and the study data have been obtained from the data set related to the United Nations Population, updated by the organization in 2015. To analyze the data, the Stata statistical package was used. In this study, the raw data for the three indicators of life expectancy, Total Fertility Rate (TFR), and the percentage of people above 65 years have been collected, coded, and used in the population of 40 European countries and 50 Asian countries disaggregated by geographic region (including North, South, South, and Central) during 1950-2015 (Figure 1). Statistical methods like nonparametric survival history analysis, Kaplan-Meier, Nelson – Ellen, and semi-parametric Cox proportional hazard model were used to analyze data and estimate the survival function. The dependent variable was population aging. According to Shrayak and Siegel classification, the countries and their percentage of the population over 65 years reached 10% as compared to old-aged countries. Independent variables of this research included life expectancy, TFR, and geographical region (continental type).

3. Results

Estimates regarding the aging process in two continents of Europe and Asia showed that the probability of aging occurrence has a negative relationship with TFR and positive relationship with life expectancy. The coefficient of -1.315 for variable of birth rates indicates that for each reduction unit in the birth rate, aging possibility increases by 1.315 and vice versa. According to the results, for every unit increase in life expectancy, the probability of aging increases 0.109 unit (about 0.11%). These values show that the general fertility rate has a greater influence on the process of population aging than the effect of life expectancy.

Estimated survival function and collective hazard function for both Asia and Europe revealed that the probability of occurrence of an accident in the area is significantly different. According to the surveys conducted, population changing trend is based on the survival function and the collective risk function. By separation of these two functions for Asian and Euro-

pean regions, it was found that the probability is high for Asian countries. According to this study, the survival function for European countries is close to zero, which means that most European countries have entered the aging process. The probability of survival of the accident for Asian countries was higher than 0.75. On the other hand, due to rising living standards, life expectancy has increased in Asia and Europe, and this amount in Asian countries has been close to that of the European countries. Despite significant differences in the average life expectancy in Europe in the 1950s than in Asia (65 years vs. 49 years), the countries of the two continents are close to each other from 2010 onwards in terms of this index. In other words, life expectancy in Europe has reached 74.6 years and in Asia, it has reached about 72.8 years.

The TFR is declining in Asia and Europe, but the rate is still higher in Asia than Europe. In the 1950s, the average rate was 2.98 in Europe, which has fallen each decade during these years and finally in 2010 onwards, the rate reached 1.52. In Asia, the overall fertility rate in the 1950s was twice higher than Europe (6.01), and despite its decline over the past half-century from 2010 onwards, it reached to 2.6 children. Therefore, it can be said that the process of fertility decline in two continents moved towards further convergence. Based on these findings (due to the rapid decline in the overall fertility rate and increase in life expectancy over the past decades), it can be said that in the next few decades, population aging will increase overwhelmingly in the remaining Asian countries.

4. Conclusion

According to the study results, during 1950 to 2015, the percentage of population aging in all regions of Europe was significantly higher than that of Asian countries. But given the rapidly declining fertility rates and

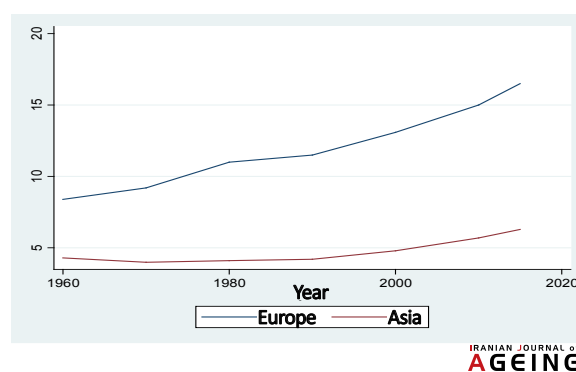


Figure 1. Population aging in Asia and Europe during 1950-2015

life expectancy increase in recent decades among the less developed regions of Asia and other parts of the world, it is expected that unlike previous decades, the process of population aging in these areas will take place more quickly. In 2050, the number and percentage of the aged population are expected to increase in developing countries and developed countries as well. Therefore, it can be said that developing countries need to catch up fast with the new reality. Many non-developed countries require new policies for financial security, health, and social care for old people.

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Conflict of Interest

The authors declared no conflicts of interest.