

Probable contribution of Data-driven investigation to solve problems in aging society

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Abstract

Japan faces the challenges of an aging society. About 25% of the total population in Japan exceeds the age of 65, which counts over 30 million. Specifically, in an aging society, we need to consider balance between demand and supply in both economic and social dimensions. This implies that it is important to understand regional dependency between population and workforce.

Firstly, I begin with our discussion from the simplest model of demography. We realize that the dominant cause of an aging society is combined with low birth and low death rates.

Secondly, I mention results of empirical analysis by using grid statistics. I use 1-km grid statistics of Japanese census population in 2010 and economic census in 2010, which are provided by Statistical Bureau in Ministry of Internal Affairs and Communications and show some association between population and labors in each grid. From a sustainable point of view (specifically, social sustainability) we need to find a way to manage equilibrium balance between demand and supply in an aging society.

Thirdly, I show empirical results for the number of job opportunities collected from a Japanese job searching site (“fromAnavi”) and an international job searching site (“Indeed”). We confirm that a relationship between the number of job opportunities and socioeconomic quantities (the population, the numbers of firms and workers) in each 1-km grid square in Japan. The number of workers is the best explanatory variable to explain the number of job opportunities in Japan. The regression coefficients can be used as an indicator to grasp Japanese macroeconomic conditions. From a global point of view, we analyze the number of job opportunities in about 16,000 cities all over the world. We confirm the daily number of job opportunities in each city varies in time and show some associations with macroeconomic indicators. We compute a relationship between means of the daily number of job opportunities and their standard deviations and confirm that it follows a scaling relationship with power law exponent $\alpha = 1$. A possible model based on Poisson processes with intensity of which varies in time on the basis of a common noise is proposed to explain the phenomenon empirically observed.

Consequently, I address several issues which we face in an aging society and mention probable contribution of data-driven investigation to improve the situation of the age and the rest of society. As conclusions, I remark necessary conditions in technological advantages of data-centric social sciences that will make it possible to maintain societal functions in a global aging era.

Keywords: Population, grid statistics, aging society, workforce, applied data-centric social sciences, labor market, job opportunities

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