

On the Application of Probabilistic Approach to the Population Projection for Japan

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In this article, we applied probabilistic approach to the population projection for Japan using expert opinion method.

In the official population projection, the scenario approach are used to express the uncertainty of the projection, which is based on three assumptions about fertility and also three assumptions about mortality. However, there are an argument that points out some problems for the scenario approach. National Research Council (2000) argued that the range of the demographic components were ill defined because no probability was explicitly assigned. They also pointed out that it was impossible to construct scenarios that simultaneously reflected the uncertainty in all the variables of interest.

Probabilistic approach could solve these problems by expressing the uncertainty of the projection with confidence intervals. There are several types of probabilistic approach depending on how the confidence intervals are constructed, such as time series analysis, expert opinion method and ex post analysis. In this article, we used expert opinion method.

Using the result of the 10000-time simulation, we illustrated maps that express the uncertainty of the age-specific population and confidence intervals of total and age-specific population. We observed that probabilistic approach contributed to better understanding of the assumptions by the scenario approach, and it enabled us to express the uncertainty of the demographic variables in more consistent way.

However, we have to recognize that the resulted confidence intervals by the probabilistic approach are projected ones. Therefore, we should use them based on comprehensive understandings how the intervals are constructed and what their assumptions are, and we also have to note that the resulted confidence intervals could change if the assumptions change.

Uncertainty is inevitable in the population projections. Probabilistic approach helps to deal with this problem, but it is also important to understand the basic properties of the population projection. More works would be needed to disseminate information about population projection including its basic properties, as well as to examine the method to express uncertainty such as probabilistic approach.