Aging in Population and Primary Energy Demand

Byeongseon Seo and Jaehong Kim

Korea University[1]

Abstract

This paper investigates the effect of aging in population on the demand for primary energy using the dynamic panel model. The principal objective is to find the dynamic relationship between the demographic changes and its consequential effect on the primary energy demand. The aging population appears prevalent world-wide, and naturally its effect on energy demand requires special attention. In this paper, we develop an economic model with demographic changes and derive a dynamic relationship between aging population and primary energy demand. An empirical model of dynamic panel, composed of 64 countries for the period 1981-2009, will be applied to assess the relationship.

[Figure 1] Scatter Diagram of Energy Demand and Aging Population
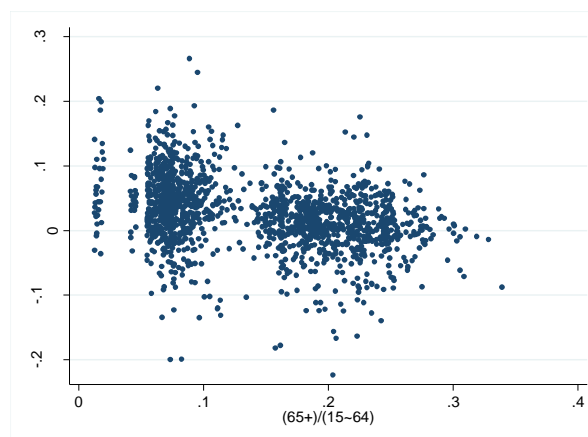

Figure 1 shows a scatter diagram of the growth rate of primary energy consumption on the elderly ratio for the dataset of 64 countries for the period 1981-2009. A casual inspection indicates a negative association between aging population and the change in primary energy demand.

Previous studies such as Kamerschen and Porter (2004), Liu (2004), and Tonn and Eisenberg (2007) examined the effect of aging on electricity consumption in the residential area. In this study, we consider the

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1. Department of Food and Resource Economics, College of Life Science, Seoul 136-701, Korea. Phone: 82-2-3290-3032. Email: seomatteo@korea.ac.kr(Seo); linkins@korea.ac.kr(Kim).

effect of aging on the demand for primary energy. Aging in population may have a positive effect on residential energy consumption. The elderly tend to use energy while staying at their own house. Moreover, they use more energy such as heating energy or electricity than before, due to their vulnerability to external environment. However, in the industrial area, aging leads to a decrease in primary energy demand because of low labor productivity caused by small portion of economically active people over total population. As the demand for primary energy in industrial area is larger than in residential area, aging may drag the demand for primary energy down.

A dynamic panel approach is employed to study this issue. The empirical analysis is based on the economic model, which provides a dynamic relationship. In the empirical analysis, we consider the role of the public policy on the elderly. If the government spends social security expenditure to improve the health conditions of the elderly, the elderly are more likely to participate in social activity. Thus, as the government spends more on the social security, the aging in population decreases the demand for primary energy.

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