The Effect of PM2.5 on the Labor Supply and Health of Middle-aged and Elderly People: Analysis Based on Chinese Data

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Abstract

The average labor market age has increased as Chinese society has gradually aged, so middle-aged and elderly workers comprise a significant portion of the labor force. The labor supply of middle-aged and elderly people significantly impacts the whole labor market. If middle-aged and elderly people retire early, it will cause the problem of labor supply reduction. The legal retirement age in China is 55 for women and 60 for men. However, many people will decide to retire early for various reasons. Economic and health factors are two critical factors influencing the retirement behavior of middle-aged and older adults. Poor health may lead to the early retirement of middle-aged and older adults, while poor economic conditions may lead to delayed retirement. Recent studies have shown that air pollution, particularly PM2.5, might affect human health and metabolism. People's productivity may decline due to poor health, leading to low income. Air pollution affects people's health and labor efficiency to different degrees, so how does air pollution affect the retirement behavior of middle-aged and older adults? In this thesis, we analyze the effects of PM2.5 on the labor supply and health of middle-aged and elderly people by combining satellite MERRA-2 data of PM2.5 and microdata of CHARLS using OLS regression. We separated the sample into two groups—farmers and non-farmers—and conducted separate regression analyses because farmers do not have a set retirement age.

In contrast to age, we define retirement in this thesis as annual hours worked. If their annual working time is less than 200 hours, we classify them as retired. We identified the five chronic diseases impacted by PM2.5 as hypertension, diabetes, lung disease, heart attack, and asthma. The prevalence and quantity of chronic diseases were used to assess each person's health status. Over the past ten years, the standard deviation of PM2.5 in the sample is 11 μg/m3.

The regression results show that PM2.5 is positively associated with retirement and has a more significant effect on non-farmers. Each 11 $\mu g/m^3$ increase in PM2.5 is associated with a 1% increase in the likelihood of retirement for farmers and a 5% increase for non-farmers. We use the presence of chronic diseases as a proxy for individual health status and show that PM2.5 impacts the health status of both farmers and non-farmers but has a more significant impact on farmers' health. Each 11 $\mu g/m^3$ increase in PM2.5 is associated with a 3% increase in the probability of developing the five diseases associated with PM2.5 for farmers and a 1% increase for non-farmers.