



Empirical Studies on the Economics of Waste Management

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論文内容の要約

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論文題目

Empirical Studies on the Economics of Waste Management
(廃棄物管理の経済学に関する実証的研究)

要旨

Waste management has been one of the major challenges for countries and cities all over the world to maintain environmentally and economically sustainable societies. The World Bank Group estimates the world generates two billion tons of municipal solid waste annually and expects growth to three point four billion tons by 2050. Only with proper waste management could we achieve the Sustainable Development Goals (SDGs) set up by the United Nations in 2015.

While most of the existing studies in waste management are focusing on the direct effects of policies on waste management, this thesis, however, looks at the indirect effects of policies related to waste management. Particularly, this thesis investigates the impact of two policies: the import ban on waste plastics and municipal mergers.

First, this thesis investigates the effects of the ban on imports of plastic waste on local air quality in China. Using city-level daily ozone concentrations, this thesis examines

whether the pollution levels differ after the implementation of the import ban. The results demonstrate that the daily ozone concentration was reduced by 2.8% in treatment areas after the import ban. Additional analyses also suggest that the effect of the ban was larger during the later period of 2018 and in coastal cities with ports while the effect of the ban might get weak in the long run. These findings highlight the effectiveness of policies that reduce the availability of inputs for pollutive activities in the short run.

Second, this thesis investigates whether municipal mergers result in a lower municipal solid waste management cost. Using difference-in-difference and propensity score matching approaches, this thesis estimates the effect of the large-scale consolidation in Japan on the various costs of managing municipal solid waste. This thesis finds that these mergers actually led to an increase in the total cost per ton. Estimation results also reveal that the construction cost increased in the post-merger period, which can be explained by the special bonds provided by the national government for new projects in merged municipalities. By contrast, the processing and management cost is little affected by the mergers, except for the absorption-type mergers. These results suggest that municipal mergers might not bring a substantial scale economy in municipal solid waste management. Policymakers should be careful when promoting municipal mergers in the belief that a scale economy will prevail after the reform.

Furthermore, this thesis investigates whether municipal mergers result in lower waste generation and promote recycling of the waste in the meanwhile. Using

difference-in-difference and generalized linear model approaches, this thesis estimates the effect of the large-scale consolidation in Japan on waste management, particularly waste generation, waste management policies, and plastic waste. This thesis finds that these mergers actually led to 11.8 kg or 3.5% higher annual waste generation per capita in the merged municipalities. Estimation results and event study analysis also reveal that there could be an announcement effect in waste generation. Furthermore, merged municipalities are over 20% more likely to change to non-charging policies for the disposal of combustible and incombustible waste, which could be the main reason for the higher annual waste generation in the merged municipalities. The number of waste separation categories is also about 5.8% higher in the merged municipalities but the effect is weak compared to the effect of charging policies. The municipal mergers do not contribute to the recycling of plastic waste as well. These results suggest that municipal mergers actually have an impact on municipal solid waste management but may not contribute to lower waste generation or more strict waste management policies.