Estimating Garbage Reduction and Recycling Promotion under Unit-based Pricing: An Application of the Multivariate Sample Selection Model

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Abstract

Many Japanese municipalities have introduced unit-based pricing to encourage reduced household waste emissions and encourage the reallocation of waste to recycling. Many studies have shown the garbage reduction effect of unit-based pricing, but very few studies have addressed the effect that garbage pricing has on the reallocation of waste emission to recyclables collection.

This paper investigates whether or not garbage pricing helps reallocate waste to recycling. A multivariate sample selection model was used to analyze the data on the quantities of garbage and recyclable materials that were being collected across several Japanese municipalities. Because many of the municipal recyclables collection data are censored, a regression equation that addresses this selectivity is included in the econometric analysis. This model allows us to correct selection bias and to take the correlation between the error terms of all equations into account.

The estimation result reveals that unit-based pricing for garbage increases the amount of recycling for some recyclable materials (PET bottles and paper containers), while it decreases the amount of garbage that is emitted. The results also indicate that error terms in the selection equation have a positive high correlation to each other, while error terms in the garbage level equation have a negative correlation to all the other error terms.

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