

International Joint Ventures between Recycling Firms and the Environment

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Abstract

In this paper, we consider the South economy which consists of duopoly final goods and recycled materials markets, where duopoly firms in each market are owned by North and South, respectively. First, we investigate the effects of a subsidy to recycling firms and a recycling-rate target on the formation of a joint venture (JV) and the profit of each recycler in the JV. Next, we examine how the price of final goods firms and the total amount of waste are influenced by these recycling policies. Finally, we present the optimal recycling rate in the case where a JV is formed or not, and then study the pattern of the optimal recycling rates. Therefore, under the assumption where the marginal cost of South recycler is higher than that of the North, we obtain the following results. (I) North and South recyclers prefer the formation of a JV to Cournot competition as long as both recyclers operate in the market. (II) Both of the recycling policies increase the JV's profit. However, the recycling-rate target decreases the South's share from the JV while the recycling subsidy increases the share. Moreover, the recycling subsidy increases both recyclers' profits from the JV, while the recycling-rate target increases (decreases) the profit of North (South) recycler. (III) Both these policies increase the profits of the downstream firms although they decrease the price of final goods. (IV) The recycling-rate target may curtail the total amount of waste if the recycling rate is higher than one-half. On the other hand, the recycling subsidy increases the total waste. (V) The optimal recycling rates may be positive in both types' recycling markets, that is, the JV and a monopoly of North recycler. Moreover, the optimal recycling rate in the case of the JV may be lower than that in the North's monopoly, and then the former drops to a lower value with an increase in the marginal cost of South recycler.

Keywords: Recycling rate, Recycling Subsidy, Joint venture, Cournot competition, Oligopoly

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