Remanufacturing
(Preliminary. Comments are welcome.)

Sophie Bernard *

April 24, 2009

*University of Ottawa, 55 Laurier E, Ottawa ON Canada, K1N 6N5 (sbern052@uottawa.ca)

Abstract

Remanufacturing is a form of recycling where used durable goods are refurbished to a condition comparable to new products. With reduced energy and resource consumption, remanufactured goods are produced at a fraction of the original cost and with lower emissions of pollution. However, remanufacturing-oriented designs generally raise initial production costs. Because the benefits of such designs are not totally internalized, technology choices are socially suboptimal.

This paper presents a theoretical model of remanufacturing where an oligopoly of original manufacturers produces a component of a final good. In this primary market, competition *à la* Bertrand with threat of entry keeps prices at the minimal production costs. The specific component needing to be replaced during the lifetime of the final good creates an aftermarket where remanufacturing activities substitute perfectly new good productions. Consumers generally prefer to purchase a replacement product remanufactured by the original manufacturers, but would consider the services of independent remanufacturers as an alternative.

The market segmentation brings profit opportunities to the original manufacturers that can engender investments in remanufacturable original products. An environmental regulation that constrains a minimum level of remanufacturability supports an increase in the original product price. Therefore, if original manufacturers can reach new margins by increasing their remanufacturing activities, they would cooperate to the application of such a regulation.

The main result coincides with the *Porter Hypothesis* which stipulates that industries respecting environmental regulations can see their profits increase.

Keywords: remanufacturing, competition, environmental regulation, Porter Hypothesis, public choice.

JEL classification: H23, L10, L51, Q53, Q58