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PII: S0925-5273(13)00412-X
DOI: http://dx.doi.org/10.1016/j.ijpe.2013.09.008
Reference: PROECO5573

To appear in: *Int. J. Production Economics*

Received date: 29 June 2012
Accepted date: 16 September 2013

Cite this article as: Baris Yalabik, Dilip Chhajed, Nicholas C. Petruzzi, Product and Sales Contract Design in Remanufacturing, *Int. J. Production Economics,* http://dx.doi.org/10.1016/j.ijpe.2013.09.008

PRODUCT AND SALES CONTRACT DESIGN IN REMANUFACTURING

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ABSTRACT

We develop and analyze an economic model of remanufacturing to address two main research questions. First, we explore which market, cost, and product type conditions induce a profit-maximizing firm to be a remanufacturer, given a separate (secondary) remanufactured goods market. Such markets exist for consumer goods, where "newness" is a differentiating factor. Second, we describe what effect profitable remanufacturing has on the environment. Our stylized modeling framework for analyzing these issues incorporates three components: lease contracting, product design, and remanufacturing volume. To operationalize this framework, we model and solve for the optimal decisions of two firm types: a non-remanufacturer, which we call a traditional firm, and a remanufacturer, which we call a green firm. We describe conditions under which remanufacturing is (and is not) profitable, and demonstrate that under certain cost and market conditions remanufacturing has negative consequences for the environment. Our results have implications for firms and policy makers who would like to choose remanufacturing as a strategy to improve profitability and environmental performance, given the existence of conditions under which neither might occur.

Keywords: product design; remanufacturing; green consumerism; durable goods; economic modeling

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