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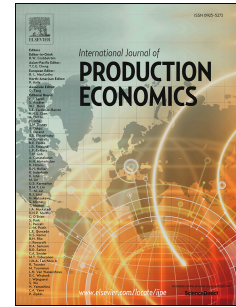
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Make or buy? It is the question: a study in the presence of carbon tax

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Abstract: In this paper, we explore make-or-buy decision of a manufacturer, taking into account the effect of carbon tax (CT). We characterize the optimal strategies including the production quantity, wholesale price, and CT rate with the CT rate considered exogenous or endogenous, respectively. We also examine the optimal make-or-buy strategies for the manufacturer under different levels of CT rate. In addition, We conduct an analysis for the government regarding when it should or should not regulate the CT rate. With the studies, some significant managerial findings are obtained for the make-or-buy decision making in the presence of CT. In particular, it is found that in addition to CT rate level, the ratio between marginal environmental cost and marginal gross profit of the product (without excluding CT) can essentially affect whether or not the government should regulate the CT rate.

Keywords: supply chain management, make-or-buy decision, carbon emission, carbon tax

1. Introduction

Outsourcing has been attracting substantial attention from academicians and practitioners for the past years. The crucial issues along with the outsourcing-related research are when a firm should outsource and when it should make by itself. It is found from previous studies that outsourcing decision depends on some key factors such as scale economies, capacity pooling, market entry, product substitution, demand risk, etc. Even though a substantial research can be found for outsourcing decision analysis, studies that take into account the factor of carbon tax (CT) are extremely seldom in the existing literature. Currently, more and more countries have issued CT-related legislations and introduced CT for controlling the carbon emission (CE), such as Quebec in Canada,

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