

Accepted Manuscript

A two-echelon sustainable supply chain coordination under cap-and-trade regulation

Jianteng Xu, Yuyu Chen, Qingguo Bai



PII: S0959-6526(16)30724-7

DOI: [10.1016/j.jclepro.2016.06.047](https://doi.org/10.1016/j.jclepro.2016.06.047)

Reference: JCLP 7418

To appear in: *Journal of Cleaner Production*

Received Date: 17 May 2015

Revised Date: 5 June 2016

Accepted Date: 8 June 2016

Please cite this article as: Xu J, Chen Y, Bai Q, A two-echelon sustainable supply chain coordination under cap-and-trade regulation, *Journal of Cleaner Production* (2016), doi: 10.1016/j.jclepro.2016.06.047.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A two-echelon sustainable supply chain coordination under cap-and-trade regulation

Jianteng Xu^a, Yuyu Chen^a, Qingguo Bai^{a,b,*}

^aSchool of Management, Qufu Normal University, Rizhao 276826, China

^bSchool of Management, Huazhong University of Science and Technology, Wuhan 430074, China

Abstract

This paper analyses the decision behaviour and coordination mechanisms for a two-echelon sustainable supply chain under a cap-and-trade regulation. In a make-to-order setting, carbon emissions are generated primarily by the downstream manufacturing process, and the market demand of the supply chain is affected by two decision variables, the sustainability level and the selling price. The impact of the unit emissions trading price on the optimal decision variables in both centralized and decentralized systems is revealed. The comparison of decentralized and centralized systems shows that the increase in total profit in centralized system is at most 1/3 that in decentralized system. To achieve the same profit as the centralized system, we consider two contracts to coordinate the sustainable supply chain, revenue-sharing and two-part tariff contracts. By analysing the conditions for a win-win outcome, we prove that only the two-part tariff contract can lead to perfect coordination. Finally, sensitivity analysis of the key parameters is undertaken as part of a numerical example illustrating the theoretical results.

Keywords:

supply chain coordination, cap-and-trade, selling price, sustainability investment

1. Introduction

As concerns about sustainable development continue to rise, reducing greenhouse gas emissions has become increasingly important. Many countries and supranational organizations have enacted legislation or designed mechanisms to curb these emissions. For example, in 2005, the European Union launched an emissions trading scheme (also called a cap-and-trade system) to provide incentives for firms to curb carbon emissions (European Commission, 2006). Under a cap-and-trade system, a government agency allocates a predetermined amount of carbon emissions (a carbon cap) to a firm. If the firm's actual amount of carbon emissions exceeds the carbon cap, it can buy the rights to emit additional carbon from a carbon trading market such as the European Emissions Trading System (EU ETS). If a firm's actual amount of carbon emissions is less than the carbon cap, the firm can sell its surplus carbon credit on the same markets (Hua et al., 2011). At present, cap-and-trade regulation is one of the most effective market-based emissions reduction mechanisms and has been widely implemented.

Sustainable supply chain management is primarily encouraged by three external factors: the regulations pressed by governments, the demand in consumer markets and the requests of other stakeholders (Seuring and Müller, 2008; Testa and Iraldo, 2010; Kumar et al., 2012). Carbon cap-and-trade regulation can be seen as incentives imposed by the the government on supply chains. In addition to government action, the consumption trend in the market is an important external motive. Purdum (2008) indicates that many consumers recognize that their consumption affects the environment, and they pressure corporations to reduce the negative effects of corporate operations. Increasingly, consumers prefer the pollution-free furnishings, green fruits, and products from companies with favorable images. In this context, firms face considerable pressure to improve their impacts on the environment. A survey sponsored by the Business Council shows that over 40% of CEOs agree on the importance of environmental and global warming

*Corresponding author. Email: hustbaiqg@hust.edu.cn

Download English Version:

<https://daneshyari.com/en/article/8101103>

Download Persian Version:

<https://daneshyari.com/article/8101103>

[Daneshyari.com](https://daneshyari.com)