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Multiperiod effects of corporate social responsibility on supply chain networks, transaction costs, emissions, and risk

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ABSTRACT

This paper develops a framework for the analysis of the optimal levels of corporate social responsibility (CSR) activities in a multiperiod supply chain network consisting of manufacturers, retailers, and consumers. Manufacturers and retailers determine their production quantities, transaction quantities, and the amount of social responsibility activities they want to pursue that maximize net return, minimize emission, and minimize risk over the planning horizon. We investigate the interplay of the heterogeneous decision-makers and compute the equilibrium pattern of product outputs, transactions, prices, and levels of social responsibility activities. The paper provides insights concerning the optimal allocation of resources to CSR activities when considering a multiperiod time frame.

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1. Introduction

Corporate social responsibility (CSR) encompasses the economic, legal, ethical, and philanthropic expectations placed on organizations by society at a given point in time (Carroll and Buchholtz, 2002). Today, CSR is not only a prominent research theme but it can also be found in corporate missions and value statements (Svendsen et al., 2001). Companies increasingly realize that their actions in purchasing and supply chain management strongly affect their reputation and long-term success (Castka and Balzarova, 2008, and references therein). Corporations are held accountable for promoting and protecting the environmental, health, and safety regulations of workers that make their products, regardless if they are direct employees or work for their suppliers. For

example, corporations like Nike, Liz Claiborne, Disney, and Wal-Mart have faced damaging media reports, external pressure from activists, and internal pressure from investors demanding that companies acknowledge responsibility for labor rights abuses in factories that make their products (Arriaga, 2008). McDonalds, Mitsubishi, Monsanto, Nestle, Nike, Shell, and Texaco have suffered damage to their reputations and sales as a result of public awareness campaigns by advocacy groups about their CSR practices (Svendsen et al., 2001). As a consequence, companies start expanding their responsibility for their products beyond their sales and delivery locations (Bloemhof-Ruwaard et al., 1995) and they start managing the CSR of their partners within the supply chain (Kolk and Tudder, 2002; Emmelhainz and Adams, 1999).

Many researchers have tried to understand business motivation to adopt CSR programs (Delmas and Terlaak, 2002; Marcus et al., 2002), legal and institutional factors shaping CSR, the effects of attitudes of managers and consumers towards CSR (Williams and Aguilera, 2008), the effects of the dissemination of industry standards such as ISO 26000 (Castka and Balzarova, 2008) and the

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relationship between the three concepts, CSR, risk, and profit (Dowling, 2001; Fombrun, 2001; Clarkson, 1991; Kotter and Heskett, 1992; Collins and Porras, 1995; Waddock and Graves, 1997; Berman et al., 1999; Roman et al., 1999).

Indeed, firms engage in CSR activities as a way to enhance their reputation (Fombrun, 2005), preempt legal sanction (Parker, 2002), respond to NGO action (Spar and La Mure, 2003), manage their risk (Fombrun et al., 2000; Husted, 2005), and to generate customer loyalty (Bhattacharya and Sen, 2001, 2004). CSR can potentially decrease production inefficiencies, reduce cost and risk and at the same time allow companies to increase sales, increase access to capital, new markets, and brand recognition.

While many companies see CSR as a means for damage control or PR, companies increasingly realize that CSR activities offer opportunities to create value (Porter and Kramer, 2006). “The practice of CSR is an investment in the company’s future; as such, it must be planned specifically, supervised carefully, and evaluated regularly” (Falck and Heblich, 2007, p. 248). It is very important that organizations take the long-term benefits of CSR into consideration when determining their optimal investment in CSR activities.

Merck & Co. Inc. is an example of a company that benefitted from reputational capital created by CSR activities in the past (Fombrun, 1996). In 1995, Merck & Co. Inc.’s Flint River plant in Albany, New York, leaked phosphorous trichloride. As a result of the leak, 45 people were taken to hospital and 400 workers were evacuated (Svendsen et al., 2001). However, the community response ranged from indifference to laudatory support of Merck. Merck was given the benefit of the doubt because it had been a good CSR citizen (Svendsen et al., 2001). While Merck & Co. Inc. benefitted from its reputational capital, BP suffered negative financial and reputational consequences due to insufficient attention to CSR activities in the past. In 2004, BP was fined a record \$1.42 million for health and safety offenses in Alaska even as the chief executive of BP was establishing himself as a leading advocate for CSR (Doane, 2005).

In reality, determining the “ideal level of CSR” activities (McWilliams and Siegel, 2001) is difficult. Even more difficult, is it to set the right incentive structures into place to ensure that this level is reached since pressures for short-term performance are often very strong (Falck and Heblich, 2007). However, to plan and communicate the value of CSR activities, its long-term effects need to be better understood (Porter and Kramer, 2006).

To contribute to this understanding, we build a multitiered multiperiod supply chain model where decision-makers cannot only decide about the product flows that they want to transact with each other but where they can also strategically allocate resources to CSR activities. The analysis of the model allows for insights on how CSR activities impact companies’ performance in the long run and how ideal levels of CSR activities are influenced by factors within as well as outside the firm.

Several of the assumptions in the model are similar to the assumptions of the conceptual model by McWilliams and Siegel (2001). As in McWilliams and Siegel (2001) we assume that firms try to maximize profits and that CSR can be viewed as an investment. However, we do not model CSR as a differentiation strategy but consider its effect on transaction costs, emissions and risk. As in McWilliams and Siegel (2001), we assume that firms must devote resources for CSR activities. We, hence, consider the tradeoff between the costs to generate CSR attributes and the benefits, which include lower risk, lower emissions and lower costs in the long run.

We explicitly include the behavior of decision-makers within the supply chain as well as the supply chain structure while we implicitly include institutional factors in the cost and risk functions. The model is flexible enough to analyze how different objectives of firms (McWilliams and Siegel, 2001), legal and institutional factors (Williams and Aguilera, 2008), and country differences (Matten and Moon, 2008) impact optimal CSR levels.

Cruz (2008) considered CSR activities and risk management in a single period setting in addition to the concept of environmental decision-making. In this paper, however, we turn to the critical issue of social responsibility activities and risk management in a multiperiod supply chain network framework. As the previous section highlighted, CSR activities lead to many long-term effects that are essential in the cost–benefit analysis of CSR activities. These long-term effects were not considered in Cruz (2008). The multiperiod framework allows us to explicitly capture these long-term effects and, hence, provides a valuable extension of previous research. Furthermore, it allows us to see how changes in the planning framework impact the decision-making, the resulting payoffs and costs.

This paper is organized as follows. In Section 2, we develop the multitiered, multiperiod supply chain network model. We describe decision-makers’ optimizing behavior and establish the governing equilibrium conditions along with the corresponding variational inequality formulation. In Section 3, we propose an algorithm and present computational studies. In Section 4, we discuss the results. We conclude the paper with Section 5 in which we summarize our results and suggest directions for future research.

2. The multiperiod supply chain network model

In this section, we develop the multiperiod supply chain network model with risk management. We assume that all decision-makers consider a fixed planning horizon which is discretized into periods: $1, \dots, t, \dots, T$. The model consists of I manufacturers, J retailers, and K demand markets as depicted in Fig. 1. We denote a typical manufacturer by i , a typical retailer by j , and a typical demand market by k . The links between the tiers represent transaction links. The variables for this model are given in Table 1. The equilibrium solution is denoted by “*”. All vectors are assumed to be column vectors, except where noted.

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