European Journal of Operational Research 245 (2015) 121–132

Contents lists available at ScienceDirect

European Journal of Operational Research

journal homepage: www.elsevier.com/locate/ejor

Production, Manufacturing and Logistics

Impacts of supplier hubris on inventory decisions and green manufacturing endeavors

Xin Lu[a,b], Jennifer Shang[b,*], Shin-yi Wu[c], Gajanan G. Hegde[b], Luis Vargas[b], Daozhi Zhao[a]

[a] College of Management and Economics, Tianjin University, Tianjin 300072, China
[b] Katz Graduate School of Business, University of Pittsburgh, Pittsburgh, PA 15260, United States
[c] W. P. Carey School of Business, Arizona State University, Tempe, AZ 85287, United States

ARTICLE INFO

Article history:
Received 1 August 2013
Accepted 26 February 2015
Available online 4 March 2015

Keywords:
Supply chain management
Vendor or retailer managed inventory
Supplier's overconfidence
Effort-dependent demand
Green manufacturing efforts

ABSTRACT

The paper studies the impact of a green supplier's overconfidence on inventory decisions in a supply chain consisting of a supplier facing effort-dependent stochastic demand and a rational retailer. The overconfident supplier may overestimate the product demand due to carbon-reduction green efforts or underestimate the variability of the stochastic demand. We characterize these two kinds of overconfidence as ability-based and precision-based overconfidence, for which we develop optimal models for three supply chain systems: integrated, vendor managed inventory, and retailer managed inventory. Extensive comparative studies are conducted to highlight the impacts of supplier's overconfidence on the inventory decisions and on different green-supply chain performance measures. We find that, under certain conditions, supplier's overconfidence prompts the supplier to exert more efforts on green manufacturing, and enhances the profits of the retailer and of the entire supply chain. Managerial insights are provided for various scenarios and propositions.
© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Recent fast economic growth has left air quality in many cities notoriously poor. Beijing is a prime example. Readings from both the official and unofficial monitoring stations suggest that air pollution had soared beyond the danger level stipulated by the WHO and reached the point deemed hazardous to human health at the beginning of year 2013. Under such a harsh environment, many customers' preference has turned to '*green*' products. Green credentials, such as '*Carbon Reduction Label*', prove businesses' commitment to carbon reduction and increase consumer's awareness of the greenhouse effect. Augstein (2011) reported that 63 percent of UK consumers are more likely to buy a specific product if they know actions were taken to reduce its greenhouse effect. As manufacturers often face *effort-dependent stochastic demand*, they are expected to reduce carbon footprint, adopt green materials, and lower energy consumption.

In the conventional supply chain (SC), the retailer makes the inventory stocking decision. This traditional retailer-managed inventory (RMI) system is justifiable as retailers often have better information about consumer demand and can manage the inventory better by optimizing the stock level for the product. Under RMI, the retailer places orders with the manufacturer who fulfills these orders. However, recently vendor managed inventory (VMI) system has gained popularity. VMI is a supply-chain initiative where the supplier is authorized to manage inventories of agreed-upon stock-keeping units at retail locations (Cetinkaya & Lee, 2000). In practice, Wal-Mart and Proctor & Gamble (P&G) pioneered VMI implementation in 1985. VMI had dramatically improved P&G's on-time deliveries and Wal-Mart's sales by 20–25 percent and inventory turnover by 30 percent (Buzzel & Ortmeyer, 1995; Tyan & Wee, 2003). Indeed, a VMI supplier can have great influence on the performance of supply chains by optimizing inventory decisions for the downstream retailer and by making quality-improvement efforts, such as low-carbon emission production.

Most of the researchers focusing on RMI/VMI and effort-dependent demand have assumed that supply chains are composed of rational players. But in reality, decision makers could be irrational due to pride or arrogance, resulting in overestimating one's competence or precision. For example, Steven Jobs, one of the greatest innovators in our time, was famous for his self-confidence. He affirmatively made his own rules on computers, stock options, and even treating his own disease. His overconfidence contributed to a good share of Apple's success and problems. The traits that made him an excellent CEO also drove him to put his company, himself, and his investors at risk (Hirshleifer, Low, & Teoh, 2012). Oftentimes, decision-makers fall into their own trap of overconfidence (Hayward & Hambrick, 1997; Li & Tang, 2010; Malmendier & Tate, 2005a, 2005b).

* Corresponding author. Tel.: +1 412 648 1681.
E-mail addresses: shang@katz.pitt.edu (J. Shang), shinyi.wu@asu.edu (S.-y. Wu).

http://dx.doi.org/10.1016/j.ejor.2015.02.051
0377-2217/© 2015 Elsevier B.V. All rights reserved.

In this paper, we address two types of overconfidence: the ability-biased overconfidence (AB) and the precision-biased overconfidence (PR). With AB, the supplier exaggerates the effect of his green-manufacturing endeavor on product demand; while with PR, the supplier underestimates the variability (standard deviation) of the stochastic demand. Such overconfidence may seriously hurt the profit of the retailer and the entire supply chain. Therefore it is important to take the supplier's overconfidence into account when facing inventory and green endeavor decisions. In this research, we investigate how the supplier's overconfidence impacts the retailer and the SC as a whole, when the demand is stochastic and effort-dependent. In particular, we develop optimal models for each of the three scenarios: integrated SC, vendor managed inventory, and retailer managed inventory and conduct extensive comparative studies to highlight the impacts of supplier's overconfidence on the supply chain performance. Specifically, we address three important SC issues:

(a) How does the supplier's overconfidence affect his green-manufacturing decision, i.e. the efforts invested in low-carbon manufacturing?
(b) Could the supplier's overconfidence create more profits for his partnering retailer and the entire SC?
(c) What is the impact of supplier's overconfidence on the implementation of RMI/VMI?

The rest of the paper is organized as follows. Section 2 reviews the related literature. In Section 3, we examine the characteristics of the problem and discuss basic assumptions. Various optimization models under different settings are presented in Section 4. Section 5 analyzes the influence of supplier's overconfidence and compares different types of overconfidence. Numerical examples are given in Section 6. Finally, we summarize and conclude the paper, and offer managerial insights in Section 7.

2. Related literature

2.1. Studies on overconfidence

Good decision-making requires not only knowledge of facts, concepts, and relationships, but also *metaknowledge*, which is an understanding of the limits of knowledge. Unfortunately, most decision makers tend to be overconfident in their beliefs and judgments. Because metaknowledge is neither recognized/rewarded in practice, nor instilled during formal education, overconfidence has remained a hidden flaw in managerial decision making (Russo & Schoemaker, 1992). Overconfident managers tend to escalate commitment by throwing good money, time and resources after bad investments, leading to faulty assessments, unrealistic expectations and hazardous decisions (Johnson & Fowler, 2011). We have observed overconfident decision makers in financial markets (Odean, 1998), corporate investments (Malmendier & Tate, 2005a), entrepreneurs' business entries (Cooper, Woo, & Dunkelberg, 1988), and even in marriages (Mahar, 2003).

Roll (1986) argues that overconfident managers undertake mergers and acquisitions that add no value due to overrate the return. Li and Tang (2010) find a positive relationship between CEO hubris and firm risk taking. Roland and Tirole (2002) and Steen (2004) theorize the existence of overconfidence. Moore and Healy (2008) divide overconfidence into overestimation, over-precision, and over-placement. In finance, Oberlechner and Osler (2012) show that overconfident currency dealers are not driven out of the market. Malmendier, Tate, and Yan (2011) show that overconfident managers use less external finance and issue less equity than their peers. Gervais, Heaton, and Odean (2011) show that it is cheaper to motivate overconfident managers to pursue valuable risky projects. Galasso and Simcoe (2011) learn that overconfident CEOs are more likely to pursue innovation.

Van den Steen (2011) believes Bayesian agents overestimate their forecast precision. Lin, Hu, and Chen (2005) claim that the greater the forecast error, the more overconfident the manager is, and the more the firms' earnings are over-estimated. Cooper et al. (1988) report that U.S. entrepreneurs believe the chance that other firms will succeed is 59 percent, while their estimate of their own chance of success is 81 percent.

Overconfidence is thus a phenomenon too ubiquitous to be ignored, such as that found in hubristic managers who face inventory decisions in supply chain. However, to date no study has been conducted to address such an issue in SC management.

2.2. Green efforts, product demand, and supply chain performance

There is a large literature on modeling the cost side of the supply chain inventory management in VMI and RMI. The advantages of implementing VMI over RMI include lower inventory costs, better response to market changes, lesser demand uncertainty, and more flexibility in production planning and distribution (Darwish & Odah, 2010). VMI minimizes the distortion of demand information transferred from the downstream SC member to the supplier. VMI suppliers control the downstream replenishment decisions rather than refilling orders as they are placed. Çetinkaya and Lee (2000) propose a VMI model to synchronize inventory decisions that optimize shipment and replenishment, which was later improved by Axsäter (2001). Similarly, Cheung and Lee (2002) develop a stocking-rebalancing mechanism for VMI to coordinate with the shipment decision.

Often, VMI manufacturers are incentivized to maintain a high stock level to satisfy customer needs and fulfill spillover demand from competitors' stock-out. However, a retailer may lose from VMI, depending on the profit margin, the holding costs, and the intensity of brand competition (Kim, 2008; Mishra & Raghunathan, 2004; Yu, Huang, & Liang, 2009). When product substitution is significant, VMI can exacerbate channel inefficiencies and perform worse than the traditional RMI (Kraiselburd, Narayanan, & Raman, 2004).

VMI implementation presents its own challenges. VMI may be ineffective if suppliers are burdened with too much cost and inventory, and excessive shipment frequency (Cooke, 1998). Consequently, researches are drawn to measure the benefits of adopting VMI. Dong and Xu (2002) found VMI always leads to a higher retailer's profit, but supplier's profit varies. It is more likely to increase the supplier's profit in the long-run than in the short-run. Yao, Evers, and Dresner (2007) analytically examine how SC parameters affect VMI cost savings.

To ensure VMI benefits all SC members, Gerchak and Wang (2004) propose a revenue-plus-surplus-subsidy incentive scheme to coordinate VMI assembly chain. Bernstein, Chen, and Federgruen (2006) show that under echelon operational autonomy, perfect coordination via simple schemes is feasible. Most studies hitherto assume that VMI players have perfect cognitive ability and possess complete SC information; only few extend to asymmetric information. For example, Corbett (2001) uses principal-agent models to study the effects of information asymmetry of setup and stock-out costs. Similarly, Yu et al. (2009) find that, in order to optimize respective net profits, the manufacturer and its retailers need to collaborate through adjusting marketing (advertising and pricing).

There have been efforts to study the relationship between SC inventory decisions and green manufacturing endeavors. In their editorial for the special issue of EJOR, Leopold-Wildburger, Weber, and Zachariasen (2009) report about the recent efforts of the OR community in understanding the relationships between green efforts and the total life cycle cost reductions. The special issue published a cluster of papers which feature the state-of-the-art, challenges and ways for improving the management of sustainable development (Quariguasi Frota Neto, Walther, Bloemhof, Van Nunen, & Spengler, 2009). Recently, Brandenburg, Govindan, Sarkis, and Seuring (2014) conduct an extensive literature search on models addressing green supply

Download English Version:

https://daneshyari.com/en/article/479547

Download Persian Version:

https://daneshyari.com/article/479547

Daneshyari.com