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Managing consumer returns in high clockspeed industries

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ABSTRACT

In this study, we address control policies to manage the collection of products that have been returned by consumers to retailers after they have been sold. Specifically, we model a consumer returns process where the operational decision of interest is the frequency in which returns are picked up from a collection point and then processed at a centralized location. Returns decay in value over time according to their industry clockspeed. Hence there is an intrinsic tradeoff in the decision – a longer interval between collections not only reduces transportation cost, but also reduces the value of asset recovery.

We analyze a stylized model with a single collection point and a centralized returns processing center. Given an asset decay rate and a fixed transportation cost we determine the optimal collection interval. We later expand the analysis to the case of a capacitated returns processing center. We also explore the value of information (number of returns held at the collection point) sharing between a collection point and the central processing facility. We find that the VOI is quite sensitive to parametric settings ranging upwards to over 20% with a median value of 5.0%. We find that the VOI increases with respect to the asset value decay rate and the rate of returns, while it decreases with respect to the shipping cost.

1. Introduction

It is surprising to find that with the tremendous increase in consumer returns over the past decade and the problems that they pose for supply chain management, there has been limited research on control policies for their management, particularly with respect to collection. In 2008, retail returns were over 8% of sales, representing more than a 20% increase from the prior year [1]. According to a study conducted by Accenture, return rates in the consumer electronics industry range between 11% and 20% [2]. For other retail segments like department stores, the rate exceeds 15%.

Not only are return rates high and increasing, but also they can be quite costly. According to Accenture, the total landed cost of returns for manufacturers ranges between 5% and 6% of sales. Moreover, most product returns are in perfect working order – that is they have no defects. These returned products are commonly referred to as false failure returns and they constitute more than two-thirds of all returns. Even the cost of handling false failure returns can be high. For computer manufacturers it can be as high as 25% of the product price [2].

One would think that a simple solution to the problem of product returns is to enforce strict return policies. Indeed, part of the growth in product returns arises from a liberalization of policies that allow their return. However, this liberalization is also coincident with a significant growth in "remote" purchases. That is, situations in which consumers buy remotely, from home or office, via the Internet, phone facsimile, or from mail order catalogs. In this light, the liberalization of return policies that has been observed arises because of both the value that consumers place on the ability to return products after purchase, and the need for firms to provide a competitive offering to the marketplace [3].

From the consumers perspective, a lenient return policy reduces the cost of reversing a bad decision and thus enables consumers to make decisions while maintaining flexibility. In consumer electronics, Accenture reports that 27% of returns arise due to buyer's remorse [2]. Since liberal return policies are valued by consumers, such policies provide a means to stimulate demand [3,4], and perhaps by as much as setting price. Conversely, making return policies strict may not be attractive or even reasonable since doing so may negatively affect demand. As stated in Shulman et al. [4], "such a policy may also harm the firm by discouraging consumers from trying the product in the first place." From this perspective, returns have become an endemic part of doing business and there is a real need for management guidance on how to best handle them. This need, coupled with a scarcity of academic research in this area, motivates our study.

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We observe different practices for consumer returns that depend on the complexity of the process needed to put the product back on the shelf. In the apparel sector, for example, most of the returned products, after a quick visual inspection, can be put back on the shelf and sold again as new products. However, sectors such as consumer electronics or domestic appliances need more than an inspection process in order to decide whether the product can go back to the shelf. In this case some rework may have to be done in the product in order to make it suitable for sale. This rework can be made at the retailer site, if the product needs minimum changes, or most probably, the returned product will have to go back to the OEM or to a refurbishing center for a more complex refurbishing process. Even when returns processing could be performed at the retail level, OEMs may require that all returns be sent back to them for the purposes of brand management. Additionally, high depreciation of the product is experienced in these sectors, which makes the recovery process a key factor to maintain the profitability of the business. In fact, value depreciation is one of the biggest challenges regarding returns that big consumer electronics retailers are facing. We will first focus on sectors in which the returned product needs to go back to a recovery facility to be processed and product value depreciation is high. However, we later extend our model to the case in which inspection of returns can be handled at the retail level such that false-failure returns may be immediately returned to the shelf for resale.

Therefore, returns, even non-defective returns, are costly for a variety of reason that include collection, transportation, testing, sorting, cleaning, packaging, and redistribution. Returns can also be damaged in the returns process itself. Common disposal methods for returned products are reselling through the primary channel, discounting through a secondary channel, or returning the product to the vendor. Regardless of their disposition, the process can take considerable time. The time it takes to process returns arises from a lack of management attention as well as a need to rationalize fixed costs and resources in the reverse logistics chain such that most processing is often done at a centralized location. At the same time, the longer product returns sit in the supply chain, the more value they lose, particularly in fast clockspeed industries. For that matter, the longer it takes to retrieve the value of a returned product, the lower the likelihood of economically viable reuse options.

To most companies, consumer returns have been viewed as a nuisance. Consequently, their legacy today is a reverse supply chain process that was designed to minimize costs and these processes are not necessarily fast. Research has shown that for high clockspeed industries there may be significant opportunities to improve asset recovery of product returns by reducing costly time delays in the reverse logistic processes [5]. Even so, the potential improvement in asset recovery must be effectively balanced with the cost of making the investments to do so.

In this paper, we address control policies for product returns management. Specifically, we explore the tradeoff between time delays on asset recovery opportunities with the cost of transportation from a collection point to a central processing location. Given an asset decay rate and a fixed transportation cost we determine the optimal collection interval. We later expand the analysis to the case of a capacitated returns processing center. We also explore the value of information sharing between the collection point and the central processing facility and assess its impact on the optimal policy.

The rest of this manuscript is outlined as follows. Section 2 positions our research within the literature on consumer returns management and the value of information. Section 3 introduces our base model and Sections 4 and 5 provide extensions. Finally, Section 6 concludes our study with discussion and future research directions.

2. Literature review

The literature on economic inventory/transportation decisions is abundant. We focus on consolidation practices which have some similarities with our work. Temporal consolidation requires holding shipments over a period of time in order to obtain some cost efficiency. Burns et al. [6] focus on minimizing the cost of distributing freight by truck from a supplier to many customers and determine the optimal trade-off between transportation and inventory costs. They compare two strategies: direct shipping to each customer in isolation and delivery to multiple customers in the same trip. The optimal solution depends on the shipment size. In the case of direct shipping the optimal size is given by the economic order quantity (EOQ) model while in the case of multiple customers the optimal size is a full truck. Also trying to minimize transportation and inventory costs, Gupta and Bagchi [7] calculate the minimum cost-effective load which should be accumulated at a consolidation center before shipment in just-in-time procurement environments. Çetinkaya and Lee [8] integrate inventory and transportation decisions in a single model that determines the frequency of outbound shipments and the replenishment inventory quantities.

Bookbinder and Higginson [9] explore cost-saving opportunities arising with shipment consolidation under different policies based on time or quantity. A time-based policy ships an accumulated load every T periods and a quantity-based policy ships an accumulated load when an economic freight quantity is available. For the case of deterministic demand both policies are equivalent.

Time-based shipment consolidation policies have become a part of transportation contracts between supply-chain partners. Such contracts are particularly useful for VMI systems. In this setting, [10] calculate the optimal replenishment quantity and dispatch frequency in order to minimize inventory and transportation costs. Diaby and Martel [11] also study the lot sizing problem considering simultaneously purchasing, inventory and transportation costs for a multi-echelon distribution system.

Beyond the literature on consolidation policies, our research is closely related to two separate research streams: closed loop supply chains (CLSC) and the value of information (VOI). In the remainder of this section, we review the key related literature in each stream and then position our research at their intersection.

From the operations and supply chain literature, product returns management falls under the general umbrella of closed loop supply chain management. For a fairly comprehensive discussion of the field see [12–14] that also contain extensive references to research on production, planning, and control in reverse logistics. For an extensive review on strategic and tactical aspects of CLSC please refer to Ferguson [15].

Most of the research in the field of CLSC concerns managing the reverse flows of products that are at their end of use or end of life. The focus for these types of return flows is on cost-efficient recovery and meeting environmental standards. With consumer returns, however, the focus is on maximizing asset recovery which generally requires flexible and responsive reverse supply chains. There are contributions, however, that do address management of consumer returns and we position our research with respect to representative examples.

Guide et al. [16] present a network flow model of consumer returns that they use to identify the drivers of reverse supply chain design. Using illustrative examples from practice, they show that for high clockspeed industries the returns network should be responsive and for low clockspeed industries the returns network should be efficient. We build on this research by developing operational policies that balance the tradeoff between efficiency and responsiveness. Ferguson et al. [17] also address consumer returns and, in particular, contracts to reduce false failure returns.