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To Keep or Not to Keep: Effects of Online Customer Reviews on Product Returns

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Abstract

While many studies examined the effects of online customer reviews (OCRs) on product sales, a clear understanding of the effects of OCRs on product returns is lacking. This study examines the impact of OCRs characteristics (valence, volume, and variance) on return decisions with a rich multi-year dataset from a major online retailer covering the electronics and furniture category. The main finding is that overly positive review valence (i.e., higher than the long-term product average), induces more purchases, but also more returns. An explanation for these findings is that OCRs help to form product expectations at the moment of purchase. Therefore, the purchase probability increases but the high expectations due to overly positive reviews may not be met, which results in negative expectation disconfirmation and consequently increases return probability as well. The effect of review valence on returns is stronger for novice buyers and for cheaper products. We further find that review volume and variance mainly affect purchase decisions, and have little to no effect on product returns. This study thus demonstrates that products returns should be considered when examining OCR effects, especially because overly positive reviews may hinder a retailer's financial performance, due to large reverse logistics costs associated with product returns.

Keywords: Product returns; Online customer reviews; e-Commerce; e-WOM

Product returns are a severe, costly problem for retailers with substantial profit impacts. U.S. customers return a hefty $264 billion worth of products annually (Kerr 2013), such that a one percent decrease in the return rate could reduce annual reverse logistics costs by an average of $17 million for large retailers (Accenture 2011). In online retailing, return rates are an even more severe problem since a recent Wall Street Journal article indicates that around 30% of the purchases are returned (Banjo 2013), and reverse logistics costs range between $6 and $18 per product (The Economist 2013).

Most products are not returned because of product defects but customers' negative post-purchase product evaluation (The Supply Chain Consortium 2008). For example in the electronics category, only five percent of the returns are related to defective products (Accenture 2011). Negative post-purchase product evaluations often arise due to the customers' limited ability to evaluate and test products before purchasing them. This limited ability creates uncertainty about product performance prior to purchase (Weathers, Sharma, and Wood 2007), which then increases the likelihood that a product will fail to meet customers' expectations (Rust et al. 1999). These unmet customer expectations result in dissatisfaction with the product and a higher return likelihood.

Customers' ability to adequately evaluate products before purchase is affected by the information provided by the retailer which thus affects the return rate (Bechwati and Siegal 2005). The costly problem of product returns has led retailers to invest in technologies such as zoom features to help customers to make better decisions and to avoid returns (De, Hu, and Rahman 2013). An additional source of information that is available on retailers' websites is online customer reviews (OCRs). OCRs complement retailer-provided information (Chen and Xie 2008), and may

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help to form customer expectations prior to purchase, and thus may affect return rates.

A large set of studies have demonstrated the strong impact of OCRs, and other types of electronic Word-of-Mouth, on sales such as confirmed by recent meta-analyses (Babic et al. 2016; Floyd et al. 2014). However, despite the importance of product returns and considerable interest in OCRs, academics and practitioners suffer from limited knowledge about the effects of OCRs on customers' product return decisions. Such knowledge is critical, when considering that predictions about the effects of OCRs on retailer performance may be overly optimistic or pessimistic if *only* the effects on sales are taken into account. It is thus the aim of this study to examine the net effect of OCRs, taking into account both the effects on customers' purchase and return decisions. We use product page views and transaction data that we gathered from a major European online retailer between 2011 and 2013, which include 8,835,645 page views that resulted in 631,063 purchase transactions for 2,164 different products in electronics and furniture categories. This unique and rich dataset allows us to examine the effects of the key characteristics (i.e., valence, volume, and variance) of OCRs available at the moment of purchase on customer purchase and return decisions by means of the page view and transaction data. Because only customers who purchased can make a return decision, we model the purchase and return decision jointly with a bivariate probit model that ensures that the return decision is made conditionally on the purchase decision and controls for product and customer heterogeneity.

A key challenge in attributing the effect of OCRs on the purchase and return decision is endogeneity. Products with better perceived quality may have more favorable OCRs, are more likely to be purchased and are less likely to be returned. Since we have longitudinal transaction data, we observe purchases and returns for the same product over a longer time period while the OCRs available for that product vary as new reviews are being posted. As such, we test how within-product variations in OCRs available over time affect the product purchase and return decision. We, furthermore, account for perceived product quality reflected in between-product average OCR variables. Moreover, we control for product and customer characteristics to account for common shocks that may influence OCRs, purchase and return probability. Based on our model and additional financial data provided by the online retailer, we simulate both the net effect (i.e., purchases–returns) and also the financial impact of OCRs on a retailer's gross margin.

The key insight of our study is that the OCRs available at the moment of purchase affect both the purchase and return decision. More specifically, if reviews are *overly positive* (i.e., current OCR valence is higher than the long term product average), this leads to more purchases but also increases the return probability. As such, review valence effects go beyond the moment of purchase, and these effects of review valence are substantial, a one point increase in review valence results in an increased purchase probability of 9.14% (electronics) and 14.60% (furniture) and increased return probability by 11.16% (electronics) and 10.34% (furniture). More notably, the effect of overly positive reviews on retailer's financial performance is negative, because of the high reverse logistics costs associated with product returns. We further find that the effect of review valence on returns is contingent on several factors. First, the effect of review valence on the return decision is weaker for customers experienced in buying at this retailer and in the specific category. Second, the effect of review valence on the return decision is also weaker for more expensive products. Regarding the effects of the other OCR characteristics, review volume increases the purchase probability but does not affect the return probability. Variance in review ratings significantly reduces the purchase probability and increases the return probability, though this latter effect occurs in only one of the two product categories. Finally, we show that OCRs reflect product quality; products with higher average long-term ratings (between product–effect) have a higher purchase and lower return probability. Thus, we establish that it is essential to account for the effects of OCRs on customers' return decisions.

With this study, we contribute to the literature by demonstrating that OCR effects go beyond the moment of purchase and also affect decisions to return or keep purchased products. There is only one study that also examines the effects of OCRs on product returns (Sahoo, Dellarocas, and Srinivasan 2016). Our study differentiates in two important aspects from this working paper. First, we consider valence, volume, and variance of OCR explicitly, while Sahoo, Dellarocas, and Srinivasan (2016) only consider volume and variance of OCR and use valence as a control variable. However, recent meta-analyses (Babic et al. 2016) stressed the relevance of OCR valence and, thus, it is critical to explicitly consider OCR valence. Second, we include both the within- and between-product variations of OCR in our model. We show that the positive effect of review valence on the return decision (i.e., within-product effect) contrasts the product quality effect reflected in review ratings (i.e., between-product effect): products with higher average long-term ratings have a higher purchase and lower return probability. The results that can be compared between both studies are consistent, but our approach provides richer insights by addressing all three OCR characteristics and by including both within- and between-product effects.

Theoretical Background

Customers' decisions to purchase and return a product are based on their level of expectations about the product's performance and the uncertainty surrounding these expectations. Uncertainty arises because customers do have incomplete information about the product when purchasing online (Wood 2001), so their expectations are imperfectly informed (Golder et al. 2012). Both customers' level of expectations about product performance and the attached uncertainty together determine customers' expected product utility (Rust et al. 1999). Customers decide to purchase a product if the expected utility is greater than the utility of not buying it (McFadden 1974). The level of expectations affects customers' purchase probability positively, whereas uncertainty reduces the purchase probability because customers are generally risk averse (Rust et al. 1999).

However, the information provided at the moment of purchase does not resolve the product at full and so customer