

Effects of Out-of-Stock, Return, and Cancellation Amount on Order Amount of Online Retailers

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Introduction and Purpose: Despite the spectacular success for online retailers in the last few decades, some inherent weaknesses remain, including stock-out, returns, and order cancellations, which influence financial performance of online retailers (Ofek, Katona, & Sarvary, 2011). These issues could be more serious in online fashion retailers because fashion products are seasonal and consumers have a strong preference to touch and try on products before purchase (Grewal, Iyer, & Levy, 2004). Thus, understanding the effect of those undesirable sales situations (i.e., out-of-stock, returns, and order cancellation) is critical because these problems negatively affect not only the firm's financial performance but also potential customer satisfaction. Despite understanding the importance of these undesirable sales situations, no existing study, to our knowledge, has investigated the extent to which each issue impacts on financial performance with actual transaction data of online fashion retailers. Thus, this study aims to examine the effect of undesirable sales situations (i.e., out-of-stock, returns, and order cancellations) on financial performance (in this study, order amount) of an online retailer. In addition, the effects of undesirable sales situations on financial performance will be examined by product category (i.e., accessories, casual, kids, men's, sports, and women's clothing).

Literature Review and Hypotheses: This study proposed a research model with six hypotheses. Stock-outs create severe revenue loss. A study found that retailers can lose nearly half of intended purchases when customers encounter stock-outs (Corsten & Gruen, 2004). Thus, H1a: *Out-of-stock amount* will be negatively related to *order amount*.

This study suggests that consumer reactions to the out-of-stock situation differ by fashion product categories. Because high-involvement products require intensive information search and a comprehensive purchase decision process (Solomon & Rabolt 2009), it will be difficult for consumers to buy a substitute in an out-of-stock situation. Thus, H1b: The relationship between *out-of-stock amount* and *order amount* will be moderated by *fashion product category*.

Product returns are an important and necessary feature of online retail for customers. However, returns have been considered as a major cost for retailers and source of potential customer dissatisfaction. Product returns reduce profits by 3.8% on average for online retailers (Petersen & Kumar, 2009). Thus, H2a: *Return amount* will be negatively related to *order amount*.

Due to the limitation of the strong desire to touch and try on products in online stores, products for which consumers require more physical inspection to determine fit will show high return rates (Grewal et al., 2004). Thus, H2b: The relationship between *return amount* and *order amount* will be moderated by *fashion product category*.

Cancellation of order always dampens retailers' financial performance. Recently, a study found that the overall average order cancellation rate in online stores is about 37% (Bae, Nam, & Kim, 2011). Thus, H3a; *Cancel amount* will be negatively related to *order amount*.

Since fashion products have a particular disadvantage in an online context due to the lack of opportunity to feel and try on the garments, the risk and uncertainty of products in online stores may often generate order cancellation (Ofek et al., 2011). Thus, 3b: The relationship between *cancellation amount* and *order amount* will be moderated by *fashion product category*.

Method: To test the hypotheses, we set up a random-effect model, as below, in which the impacts of out-of-stock, returns, and cancellation amounts in the previous month, $t-1$, on the order amount in the current month, t by brand, i were examined.

$$\text{Order}_{it} = \beta_{0i} + \beta_1 \text{OutStock}_{it-1} + \beta_2 \text{Return}_{it-1} + \beta_3 \text{Cancel}_{it-1} + \sum \beta_{4j} \text{OutStock}_{it-1} \times \text{Category}_{ij} \\ + \sum \beta_{5j} \text{Return}_{it-1} \times \text{Category}_{ij} + \sum \beta_{6j} \text{Cancel}_{it-1} \times \text{Category}_{ij} + \sum \beta_{7k} \text{Control Variables}_{k,it} + \varepsilon_{it}$$

- Order: Order amount in the current month
- OutStock, return, and cancel: Out-of-stock amount, return amount, and cancellation amount in the previous month
- Category: six categories (i.e., women, men, casual, kids/life, sports, and accessories). The casual category is the base category for analysis.
- Control variables: five category dummy variables and months

The model was tested with transaction data obtained from an online shopping mall in South Korea. The data included 371 brands in six categories, with 3,367 observations in total; after exclusions (i.e., brands with less than six months observation periods), 2,996 data sets were utilized for the data analysis. Using a multiple regression model with fixed effects, the hypotheses were tested.

Findings: All hypotheses, except H3a (i.e., Cancellation amount will be negatively related to order amount), were accepted. The results showed that out-of-stock amount negatively influenced order amount ($\hat{\beta} = -6.829$) in the casual, accessories, kids categories. The negative effects were stronger in the men and sports categories ($\hat{\beta} = -14.55$ and -9.30 , respectively), while the negative effect was weaker in the women category ($\hat{\beta} = -4.27$). Return amount also negatively affected order amount ($\hat{\beta} = -6.62$) in the women, casual, and kids categories. The effect was more negative in the men category ($\hat{\beta} = -9.77$), while the negative effect was weaker in the accessories category ($\hat{\beta} = -3.23$). Unlike out-of-stock and return amounts, cancellation amount had a positive impact on order amount ($\hat{\beta} = 8.17$) in the casual and sports categories. The effect was more positive in men category ($\hat{\beta} = 11.52$), but the positive effect was less pronounced in the women accessories, and kids categories ($\hat{\beta} = 5.67$, $\hat{\beta} = 3.19$ and $\hat{\beta} = 4.63$, respectively).

Discussions and Implication: This study provides meaningful academic and managerial implications. This study confirmed the effect of undesirable sales situations (out-of-stock and return amounts) on financial performance of an online retailer with transaction data. Additionally, this study verified that undesirable sales situations were moderated by fashion product category. This finding suggests that practitioners should consider managing and developing product handling and inventory by product category. Interestingly, the cancellation amount had a positive impact on sales. It appears that cancellation of orders could not be a negative factor, and may even be positive, as far as the online shopping mall provides alternatives in the same category for the consumer to stay in and search for other products within the mall. That is, order cancellation can create another purchase. The finding implies the depth of a product category complements the negative aspect of a product causing cancellation. Another interesting finding is that the men's category is the most sensitive to all the undesirable sales situations. It appears that consumers of men's are not only more responsive toward stock-outs and dissatisfaction with a product (e.g., they do not wait for products to be restocked) but also more promptly search out and purchase other alternatives available in the mall.

References will be provided upon request.