IMPACT OF PROMOTION ON ONLINE REVIEW RATINGS: THE MODERATING ROLE OF TEMPORAL DISTANCE AND DEAL PRONENESS

Ji Wu  
Sun Yat-Sen University, wugide@gmail.com

J. Leon Zhao  
City University of Hong Kong, jlzhaol@cityu.edu.hk

Shaokun Fan  
West Texas A&M University, sfan@wtamu.edu

Follow this and additional works at: http://aisel.aisnet.org/pacis2016

Recommended Citation
http://aisel.aisnet.org/pacis2016/310

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2016 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
IMPACT OF PROMOTION ON ONLINE REVIEW RATINGS: 
THE MODERATING ROLE OF TEMPORAL DISTANCE AND DEAL PRONENESS

Ji Wu, Department of Management Science, Sun Yat-Sen University, Guangzhou, China, wugide@gmail.com
J. Leon Zhao, Department of Information Systems, City University of Hong Kong, Hong Kong, China, jlzhao@cityu.edu.hk
Shaokun Fan, Computer Information and Decision Management, West Texas A&M University, Canyon, USA, sfan@wtamu.edu

Abstract

Promotion and online reviews — have been considerably studied separately. Although marketing literature has shown that promotions could influence customer postpurchase evaluative response, little is known about how promotions will affect customer behavior in online reviews. This research examines the effects of promotion on online review ratings. In addition, this study also explores how temporal distance between purchase and posting online review, and customer deal proneness moderate the relationship between promotion and online review ratings. We collect a unique dataset by combining customer transaction records with their behavior in online reviews, and use an ordered probit model to test our hypotheses. Our results show that coupon promotions have a positive impact on online review ratings, and the strength of this impact varies in reverse of the time delay between purchase and posting online reviews. And this relationship is enhanced when customers have high deal proneness.

Keywords: coupon promotion, online review rating, temporal distance, deal proneness
1 INTRODUCTION

In the post-Internet market, firms strive to influence customer purchase decisions through various marketing tools. On one hand, new marketing tools, such as online product reviews, are often provided by firms to evoke customer purchase. On the other hand, traditional promotional strategies, such as coupon promotion, are still employed by firms to affect customer purchase decisions. Consequently, e-commerce companies often provide both online product reviews and promotional coupon to drive their sales. Despite of the frequent coexistence of online reviews and coupon, there appear to be few papers studying the type of interactions between these two marketing tools.

Recently, Lu et al. (2013) take notice of the coexistence of online coupon and online reviews in third party review platforms, and they investigate the comparative influence of coupon and online reviews on product sales when both are offered to consumers simultaneously. However, they do not explore how consumers receiving coupon will affect their behavior in online reviews. Byers et al. (2012) observe the relationships between firms’ usage of Groupon and their Yelp ratings, and they find that running a Groupon offer declines firm’s review ratings. Bayes et al. (2012) interpret this phenomenon as a combination of poor business behavior, Groupon user experimentation, and an artificially high baseline. Bayes et al. (2012)’s study is on the platform and firm level, and the negative relationship between promotion and online review ratings is attributed to the platform’s factors and the firm’s factors.

Bayes et al. (2012)’s findings seem to show that firm’s promotional marketing will hurt its reputation in online reviews. In contrast, marketing literature has long shown that promotions can evoke positive consumption experience and thus influence evaluative response (Naylor et al. 2006). Therefore, our questions arise: Will a consumer, who receives promotions from a product, give low ratings in its online review? Will this effect be the same for all consumers and all the time? In this study, we collect data at individual level. We integrate consumers’ purchase records with their online product reviews data from an e-commerce company, and explore how coupon promotions influence customer online review ratings postpurchase. What’s more, we also investigate how temporal distance between payment and posting online reviews and individual deal-proneness will moderate the impact of promotions on online review ratings.

This research makes several important contributions to the literature of promotion and online review. First, although existing research begins to explore the relationship between promotional marketing and online review, little is known about how consumer engagement in one marketing action (i.e., receiving promotion) will affect their behavior in the other (i.e., online review rating). This study shows that promotional marketing can also influence product sales via affecting customer behavior in online reviews. Second, online review literature has shown that review environment affects customer behavior in product reviews (Goes et al. 2012, Moe et al. 2012). This study provides a new perspective to investigate the factors that influence customer behavior in online reviews. Third, this study also empirically examines the temporal effect of promotions and shows how individual deal-proneness determines the effects of promotions on online review ratings. The findings will extend our understanding on both promotion effect and online product review behavior.
2 HYPOTHESES DEVELOPMENT

2.1 Main Effect

Coupon promotion may have positive influence on customer product evaluation, and the impact will be salient in their online reviews. According to Chandon et al. (2000)’s framework of benefits of a sale promotion, promotions equip not only utilization benefits but also hedonic benefits. First, promotions can be translated into economic benefit (i.e., monetary saving). This unexpected psychological income helps customers dampen the “pain of payment” experienced from the transaction and allows them to enjoy consuming a product more. Second, procuring promoted items will enhance customer self-perception of being smart or good shoppers and provide an opportunity to reaffirm their personal values. These hedonic benefits created by exposure to promotional stimuli will elevate customer mood and evoke positive evaluative responses (Heilman et al. 2002; Naylor et al. 2006). According to an affect-as-information conceptualization, a positive mood or affect acts as additional information when people evaluate a situation or object (Biggers et al. 1982; Schwarz et al. 1983). Therefore, a customer in a good state as a result of receiving a price cut will have a more favorable evaluation on the promoted products (Heilman et al. 2002; Naylor et al. 2006). Because customer online product reviews represent their evaluation of products, we assume that the positive effects on product evaluation derived from price promotions will be salient in customer online ratings. Therefore, this study proposes:

**H1: Coupon promotion will have a positive impact on the ratings of products in online reviews**

2.2 Moderating Effects

2.2.1 Temporal Distance

The temporal distance between payment (the time when customers receive their products) and posting online reviews moderates the relationship between promotions and online review ratings. Prior studies examine that the positive mood effect evoked from promotions is relatively transient (Crowder 1976; Heilman et al. 2002; Naylor et al. 2006). Therefore, if customers delay consume or experience the promoted products, the mood effect may dissipate and be lost within a period of time. Lee et al. (2014) investigated how price discounts interact with delay consumption to affect customer consumption experience, and they found the positive mood effect on consumption experience that promotions induce would diminish when consumption is decoupled from the sales transaction by a time delay. What’s more, studies also suggest that providing online coupon for a product may reduce customer attention (i.e., reduce sunk-cost consideration) during consumption and thus dampen consumption enjoyment (Wathieu et al. 2007). And the negative attention effect on consumption experience is more likely to be significant if there was a time delay between payment and action (Lee et al. 2014). After receiving and paying for a promoted product, customers can evaluate products and generate online reviews either right away or after a delay. When customers consume and evaluate the product immediately, their online review ratings are more likely to be high resulting from the positive mood effect derived from promotions. However, if there was a time delay between payment and producing...
online reviews, dilute positive mood effect and negative attention effect will lead their online review ratings postpurchase to be less high. Therefore, this study assumes:

H2: Temporal distance negatively moderates the relationship between promotion and online review ratings postpurchase.

2.2.2 Deal Proneness

Promotion effects are always moderated by individual difference variables (Inman et al. 1990). In this study, we explore how customer deal proneness moderates the relationship between promotion and online review ratings. Deal proneness is defined as the extent that the proportion of purchases made on deal (Bawa et al. 1987; Blattberg et al. 1978). Deal-prone customers are people with high percentage of on-deal purchases and they are often identified via their purchase history (Hackleman et al. 1980). Highly deal-prone customers are more likely to rely on promotional signal or stimuli to make purchase decision and product evaluation (Zeithaml 1988).

Previous studies show that deal-prone customers are low need for cognition (DelVecchio 2005), and they are more likely to travel the peripheral route to persuasion (Cacioppo et al. 1982) and rely on promotional signal to evaluate products. Therefore, compared to customers with low deal proneness, deal-prone customers are more likely to be influenced by the effect evoked from promotion. This study hypothesizes:

H3: Reviewer deal proneness positively moderates the relationships between promotion and online review ratings postpurchase.

3 RESEARCH METHOD

3.1 Data Collection

We collect our data from an e-commerce company, which sells female apparel in an Asian market. The retailer sells products in its own e-commerce website, and customers can post online product reviews in this website postpurchase. Our data set consists of two parts. First, this firm provides us with the detailed purchase trade orders of 10,896 customers from May 2011 to December 2012. This transaction dataset involve coupon-promotion information in each trade order. Second, we collect all of the online reviews posted in the websites during this time period. The online review data set contained records of (1) the content of online reviews, (2) the ratings of the reviews, (3) the IDs of customers who generated the product reviews, (4) the IDs of products that the reviews were commented on, and (5) the time when online reviews were posted. There are more than 2,300 customers created about 11,000 online reviews on 1,300 products. We linked online review data to transaction data by customers IDs, product IDs, and the date of purchasing and generating online reviews. We also eliminated first and second reviews of a product for removing the possible bias generated by the fans of the products or brand (Li et al. 2008). Our final data sample for model estimations has 1,394 customer and 7,128 observations on 885 products.
3.2 Variables

The dependent variable of our analysis (\( \text{Rating}_{jit} \)) is an online review rating of a product \( j \) provided by customer \( i \) at time \( t \) (the star rating takes on a value from \{1, 2, 3, 4, 5\}). With respect to operationalization of the independent variables, coupon promotion (\( \text{Coupon}_{jit} \)) measures the price discount that a customer \( i \) received by using online coupons when he/she purchased a product \( j \) at time \( t \). Temporal distance (\( \text{Distance}_{jit} \)) is the days difference between the date that a customer posted an online review on a product and the date that the customer purchased the product. Deal proneness (\( \text{Deal}_{it} \)) is measured as the proportion of products the customer buys on promotion, i.e., the number of products bought on promotion divided by the total number of products purchased in a given time period.

We also include in our model several control variables to control for alternative explanations. First, we control for product heterogeneity by the following variables: (1) we account for shipping fee (\( \text{Shipping}_{jit} \)), i.e., the freight that a customer \( i \) paid for his/her product \( j \) at time \( t \); (2) we use an average price of a product \( j \) to control for the influence of product quality that is reflected by the differentiated price levels (\( \text{Price}_{jt} \)); (3) we use product dummy variables to control for any unobserved product heterogeneity. Second, Ma et al. (2013) suggested that the average ratings of prior reviews would affect the ratings of subsequent reviews. We control for this effect by including a variable \( \text{PriorAvgRat}_{jt} \), which measures the average online review ratings of a product \( j \) before time \( t \). Third, Godes et al. (2012) demonstrated that the disagreement about the products would influence customer online review ratings, and we account for this influence by involving a variable \( \text{PriorVarRat}_{jt} \) that indicates the variance of prior review ratings of a specific product \( j \) before time \( t \). What’s more, in order to control for the temporal effect of online review ratings (Li et al. 2008), we include a variable \( \text{ReviewTime}_{jit} \), which measures the temporal distance between the date when a customer \( i \) generates an online review on a product \( j \) and the date when the product \( j \) is firstly commented. Finally, we control for customer relationship with the retailer by including a variable \( \text{Tenure}_{it} \), which measures customer tenure in the firm at time \( t \). Table 1 shows the descriptive statistics of variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std.</th>
<th>Variable</th>
<th>Mean</th>
<th>Std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>3.836</td>
<td>1.550</td>
<td>Price</td>
<td>240.525</td>
<td>263.979</td>
</tr>
<tr>
<td>Coupon</td>
<td>18.073</td>
<td>34.231</td>
<td>PriorAvgRat</td>
<td>3.867</td>
<td>1.305</td>
</tr>
<tr>
<td>Distance</td>
<td>11.842</td>
<td>19.504</td>
<td>PriorVarRat</td>
<td>1.288</td>
<td>1.433</td>
</tr>
<tr>
<td>Deal</td>
<td>0.234</td>
<td>0.292</td>
<td>ReviewTime</td>
<td>84.976</td>
<td>120.377</td>
</tr>
<tr>
<td>Shipping</td>
<td>2.061</td>
<td>4.273</td>
<td>Tenure</td>
<td>109.027</td>
<td>123.045</td>
</tr>
</tbody>
</table>

Table 1. Descriptive statistics

3.3 Model Specification

The mechanism for product ratings in our dataset uses an integer value from 1 to 5 to access the product’s overall quality. We follow an ordered probit specification in parameterizing the rating’s decision. Following is our model specification1:

1 Variables Coupon, Distance, Shipping, Price, ReviewTime, and Tenure are transformed into their natural log, becoming ln(Coupon+1), ln(Distance+1), ln(Shipping+1), ln(Price), ln(ReviewTime) and ln(Tenure), for their right-skewed nature.
\[
\Pr(Rating_{jit} = k) = \Pr(\kappa_{k-1} < U_{jit} \leq \kappa_{k})
\]

\[
U_{jit} = \beta_0 + \beta_1 Coupon_{jit} + \beta_2 Distance_{jit} + \beta_3 Coupon_{jit} \times Distance_{jit} + \beta_4 Deal_{it} + \beta_5 Coupon_{jit} \times Deal_{it} + \beta_6 Shipping_{jit} + \beta_7 Price_{jt} + \beta_8 PriorAvgRat_{jt} + \beta_9 PriorVarRat_{jt} + \beta_{10} ReviewTime_{jit} + \beta_{11} Tenure_{it} + \tau_j + \delta_i + \epsilon_{ijt}
\]

where \(U_{jit}\) denote the latent utility; \(k\) is a realized value of a rating with \(k \in [1,5]\); \(\kappa_k\) is a cutoff.

### 4 PRELIMINARY RESULTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupon_{jit}</td>
<td>0.419***</td>
<td>0.155</td>
</tr>
<tr>
<td>Distance_{jit}</td>
<td>-0.242**</td>
<td>0.098</td>
</tr>
<tr>
<td>Coupon_{jit} \times Distance_{jit}</td>
<td>-0.056**</td>
<td>0.022</td>
</tr>
<tr>
<td>Deal_{it}</td>
<td>-1.682***</td>
<td>0.555</td>
</tr>
<tr>
<td>Coupon_{jit} \times Deal_{it}</td>
<td>0.639***</td>
<td>0.239</td>
</tr>
<tr>
<td>Shipping_{jit}</td>
<td>-0.180**</td>
<td>0.076</td>
</tr>
<tr>
<td>Price_{jt}</td>
<td>-0.211**</td>
<td>0.088</td>
</tr>
<tr>
<td>PriorAvgRat_{jt}</td>
<td>0.422</td>
<td>0.475</td>
</tr>
<tr>
<td>PriorVarRat_{jt}</td>
<td>-0.157**</td>
<td>0.085</td>
</tr>
<tr>
<td>ReviewTime_{jit}</td>
<td>0.027</td>
<td>0.052</td>
</tr>
<tr>
<td>Tenure_{it}</td>
<td>0.189***</td>
<td>0.068</td>
</tr>
</tbody>
</table>

**Table 2. The ordered probit results**

*** significant at 0.01, ** significant at 0.05, * significant at 0.1

Table 2 presents the estimation results of the ordered probit model. We use parameters estimated from the empirical model to test our hypotheses. First, we examine the main effect of promotions on online review ratings postpurchase. H1 predicts a positive effect of promotions on customer online review ratings. The positive and significant coefficient of Coupon_{jit} supports H1. This implies that receiving promotions can lead customers to rate higher in their product reviews. H2 postulates a weaker relationship between promotions and online ratings by temporal distance between purchase and posting online reviews. The negative and significant coefficient of the interaction term Coupon_{jit} \times Distance_{jit} supports H2. Moreover, H3 posits that the relationship between price promotions and the ratings of products in online reviews enhances by customer deal proneness. The coefficient of the interaction term between promotions and customer deal proneness is significant and positive, and thus H3 is supported. When receiving a coupon discount, deal-prone customers tend to rate the products higher in their online reviews postpurchase than those who are low deal proneness.

The results from our control variables are also notable. First, our finding shows that deal-prone customers are more likely to be critical in their online review ratings. Deal-prone customers are often experimenting when they purchase promoted products, and thus they tend to have a more tenuous fit with the retailers or products, resulting a lower online review ratings (Byers et al. 2012). Second, consistent with Li et al. (2010)’s results, we found that both price and shipping fee have negative impacts on online review ratings. Third, our results show a negative effect of the variance of prior review ratings. Finally, old customers are more likely to rate higher in their product reviews than new customers.
5 DISCUSSION AND CONCLUSION

Researchers and practitioners have expended considerable effort in studying promotional marketing and online reviews but have devoted far less attention to understanding them together. In this study, we explore how promotions affect customer online review ratings. Our study contributes to the literature on both promotional marketing and online product review. On one hand, our findings show that the positive effect of promotional stimuli can be reflected in consumers’ online review ratings. On the other hand, customer behavior in online reviews is not only influenced by review environment but also influenced by customer engagement in promotional marketing. In addition, this study investigates how temporal distance between payment and posting online reviews and individual deal-proneness will moderate the impact of promotions on online review ratings. Through emphasizing the temporal effect of promotional stimuli and individual difference in perception of promotional stimuli, this study cannot only help use understand the relationship between promotional marketing and online review rating better, but also can allow managers to employ promotional tools to influence customer behavior in online product reviews more efficient.

We also discuss our future work. First, online review rating behavior involves a two-step decision-making process. In step 1, customers decide whether to generate online reviews postpurchase. In step 2, once they decide to contribute, they determine what to contribute. Therefore, there is a sample selection bias in our model. Our future work will use a two-step model to overcome this issue. Second, will specify a hierarchical structured model for the review behavior in future work. A hierarchical structure comes natural to our panel data and can be understood as having review activities at the bottom-level unit of analysis and reviewer characteristics (i.e., deal proneness) at the top-level unit of analysis. This specification can overcome the intrareviewer correlation issue. Third, we will conduct lab experiments to justify our results in the future.

REFERENCE


