Willing Mind Makes a Light Foot : The Effects of the Distances on the Purchases and Redemptions of Online Daily Deals

Research in progress

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Abstract

The online daily deal businesses initiated by Groupon have changed the way many online shoppers find bargains for local services. Will the distance influence the consumers’ decision to purchase at the daily deal site? How far does a consumer travel to use her discount online voucher? In this paper, in particular, we empirically examine the micro level data of a Groupon-like daily deal web site to identify the effects of the distance on the purchase and redemption of vouchers. We analyze the dataset extracted from the transactional database during the period between July 2010 and December 2010. The results show that the number of purchase increases as the stores get distant from the predefined consumers’ local region. Whereas consumers redeem the vouchers of the remote places later on average in that the voucher redemption rate decreases as the stores get distant.

Keywords: Electronic Commerce, Online Discount Voucher, Online Daily deals, Internet Retailing, Geography

Introduction

The daily deal industry initiated by Groupon has been said to bring more than 700 copycat businesses and change the way a number of online shoppers find bargains for local products such as restaurant vouchers (Business Week, 2011). Numerous web sites similar to the original model are operational internationally. Even though some raise an issue that it is unclear whether industry diversification, increasing competition, and larger revenue shares for merchants will disrupt the major players or cannibalize the industry as a whole (Forbes, 2012), daily deal industry has showed positive growth figures.

“Deal of the day” web sites provide electronic commerce offering bargain deals per region typically for a period of 24 hours. Members of deal of the day websites receive online offers and invitations in email, mobile message and social networks. They provide the daily deal information in the local region registered when consumers signed up. When consumers purchase an offer, the deal expires typically in 3 to 12 months. Some specialists in the consumer protection area raise issues that some of daily deal sites want to make money from the non-redemption
(Marketwatch, 2011).

Our purpose of carrying out this study is to test empirically how the voucher purchase and redemption varies as the stores get distant from the predefined consumers’ region. In this article, tests for the number of purchases and redemption rate over the distances have been performed with an analysis of micro level data which was received from a Groupon-like daily deal site. The results show that the number of purchase increases as the stores get distant from the predefined consumers’ local region. Whereas consumers redeem the vouchers of the remote places later on average in that the voucher redemption rate decreases as the stores get distant.

The remainder of this article is organized as follows. Following section presents a literature review related with discount online voucher, electronic commerce and location. Then we describe the research design and hypotheses. In the next sections we present econometric models and results, and discuss their implications.

**Literature Review**

Literature on daily deal industry is growing as the industry is getting mature rapidly. A survey study of small businesses partnering Groupon is performed (Dholakia, 2011). A couple of analytical models with descriptive statistics to explain the daily deal economics and marketing strategy are presented (Edelman et al., 2011; Byers et al., 2011; Kumar and Rajan, 2012).

Theoretical research on the competition between direct retailing and traditional brick-and-mortar retailing can be traced to Balasubramanian (1998). By analyzing a game-theoretic model that has a direct retailer and multiple brick-and-mortar stores, he suggests that the direct retailer competes with local stores. In a landmark paper, Bresnahan and Reiss (1991) show that as the number of competing firms in a local market increases, the competition becomes more intensified and firms’ profit margins fall. However, these papers do not study how the competition varies across different products with different search costs.

Previous empirical research has found that Internet markets can improve consumer welfare and firms’ profits through wider product selection (Brynjolfsson et al., 2003; Cachon et al., 2007), and that consumer’s demand through the Internet channel is higher in local markets where local prices and sales tax rates are high (Goolsbee, 2001; Chiu, 2008). However, the impact of local market structures on consumers’ Internet demand has not been much explored by previous literature.

Our paper is closely related to two interesting papers that study how geographic variables have an impact on consumers’ online behavior – Sinai and Waldfogel (2004) and Forman et al. (2009). A few papers in marketing have leveraged spatial data to understand consumers’ behaviors (Bradlow et al., 2005). For example, Jank and Kannan (2005) show that including spatial dependence can help predict whether a consumer purchases an electronic copy or a print copy of the same book. Complementarity between online and physical channel has been observed in services as well. Hitt and Frei (2002) show that the existence of dual channels can increase the retention rate of customers in the context of PC banking. Campbell and Frei (2010) find that introduction of online banking service leads to an increase in overall banking service consumption and upsurge in total transaction volume. Addition of an online channel to a traditional channel can also lead to negative demand effects (Geyskens et al., 2002). Targeting the same customer segment and offering similar products, online stores and physical stores may face cross-channel competition (Brynjolfsson et al., 2009).

Our paper complements previous research and differentiates itself by analyzing micro-transaction data empirically and by focusing on the effect of the distance on the purchase and redemption of online discount voucher in daily deal industry.
Research Design and Hypothesis

The company we study was once one of the global top 5 daily deal sites. It sells wide range of services product from restaurant, café, healthcare, and so forth. Figure 1 illustrates the locations of the online daily deals across the nation in our whole data set. We find the majority of products are concentrated in the metropolitan areas.

![Figure 1. Product Locations with Sales Volumes](image)

To investigate how varied the redemption rates are through the distance between predefined local region and stores, we extract the panel data from the transactional database during the period between July 2010 and December 2010. The transactions of 48 products and 17,058 customers were selected as the sample for our study.

We formulate our hypotheses on how many purchases happen and how varied redemption rates are with the change of the distance in the daily deal industry. Sinai and Waldfogel (2004) find that consumers connect to the Internet to overcome spatial isolation (e.g., distance to retail stores, racial isolation). Forman et al. (2009) find evidence that the existence of a discount store or a large bookstore in a geographic location decreases the likelihood that a popular book will appear in Amazon’s list of top 10 bestselling books for that geographic location.

**Hypothesis 1:** The number of purchases will be influenced by how distant the stores get from the predefined consumers’ local region.

**Hypothesis 2:** Redemption rate will be influenced by how distant the stores get from the predefined consumers’ local region.
Econometric Model and Results

We investigate the effect of the distance on the number of purchases. Through OLS, Poisson and negative binomial regression, we clarify the correlation between the dependent and independent variables with the control of consumer and product characteristics.

\[ y_i = X_i \beta + D_i + \varepsilon_i \]  

where \( y_i \) is the dependent variable of the number of purchases of product \( i \). Independent variables in the model, \( X_i \), are distances of product \( i \). In addition, control variables for product and consumer characteristics are included such as discounted prices, preferred region, e-mail or mobile message notification options, gender and ages. Time control variables for day and week, are also inserted. To see the distance effects in details, we add the dummy variable \( D_i \) to discretize the influences of distances on the number of purchases. The distances are classified into 5 groups with the milestones of 1 km, 3 km, 10 km, and 50 km.

To analyze how varied the redemption rates are with the change of the distances, we have the panel regression model at the product and data level. The fixed effects model is appropriate than the random effects model in that it requires many more assumptions which are unlikely to hold in this setting. The fixed effects model can be described as

\[ y_{ij} = X_{ij} \beta + \alpha_i + \varepsilon_{ij} \]

where \( y_{ij} \) is the dependent variable of redemption rate, observed for each product \( i \) at date \( j \). \( \alpha_i \) represents the unobserved individual fixed effect. This is based on an assumption that \( \alpha_i \) is not independent of \( X_{ij} \), in that the redemptions are somehow affected by daily specific situations as well as the specific context of the redemption. Independent variables are percentage of discount of product \( i \) at the date \( j \), logged averaged distances of product \( i \) at the date \( j \), and validity period in days of product \( i \) at the date \( j \).

Results and Discussion

With the equation (1), \( \beta \) measures how many purchases of product \( i \) increase as the distance increases. We first estimate Equation (1) and report findings in the econometric model in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>OLS1</th>
<th>OLS2</th>
<th>Poisson</th>
<th>NBReg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logged distance</td>
<td>7,430***</td>
<td></td>
<td>0.319***</td>
<td>0.294***</td>
</tr>
<tr>
<td></td>
<td>(108)</td>
<td></td>
<td>(2.13E-05)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Dummy for 1 km to 3 km</td>
<td></td>
<td>1,574**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(753)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy for 3 km to 10 km</td>
<td></td>
<td>-8,185***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(708)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy for 10 km to 50 km</td>
<td></td>
<td></td>
<td>9,555***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(719)</td>
<td></td>
</tr>
<tr>
<td>Dummy for farther than 50 km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>33,640***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(805)</td>
<td></td>
</tr>
<tr>
<td>Logged discounted</td>
<td>-30,268***</td>
<td>-31,320***</td>
<td>-1.376***</td>
<td>-0.958***</td>
</tr>
</tbody>
</table>
The coefficients for logged distance are positively significant through the models. It can be inferred that consumers are less likely to care much about the distance to have good deals in daily deal site. Furthermore, consumers are willing to buy the vouchers provided by the store farther than 50 km when we look at the coefficients for dummy variable in the (2) in Table 1. The difference can be attributed to the likelihood that consumers in the daily deal web sites are willing to buy their vouchers where they travel soon. Consumers may send the vouchers to their remote parents and friends who are not able to access the daily deal site easily.

$\beta$ in the equation (2) measures how quickly product $i$’s redemption rate at the date $j$ increases as the independent variables of distance increase. We report findings in the econometric model in Table 2.

<table>
<thead>
<tr>
<th>Table 2. Influence of Distances on Voucher Redemption Rates</th>
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<tbody>
<tr>
<td><strong>OLS</strong></td>
</tr>
<tr>
<td>Logged distance</td>
</tr>
<tr>
<td>Days to the expiry date</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Which day</td>
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<tr>
<td>Which week</td>
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<tr>
<td>Observations</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
</tbody>
</table>

The dependent variable is redemption rate observed for each product $i$ at date $j$. Standard errors are in parentheses.

**p <0.05; ***p <0.01.
The coefficients for logged distance and period to the expiry date in the OLS and the panel model with fixed effects are negative and statistically significant. The notable point for the negative coefficient for the distance is the sign in that the redemption rate decreases as the stores get distant from the predefined consumers’ local region. Consumers may compete with a daily deal crowd when they redeem their daily deal vouchers. It is also expected to be related with the situations that some of them should call many times before anyone picked up the phone to help schedule their reservations. It is easily understood that the negative coefficient for period to the expiry date reflect the cases that consumers redeem online discount vouchers within the expiry date. For the expiry date, the legal issues arise as daily deal sites create a sense of urgency among consumers to quickly purchase vouchers for a short amount of time and consumers feel pressured and are rushed into buying the vouchers and become subject to the onerous sales conditions.

In this study, we find the evidence that consumers are less likely to care much about the distance to have good deal in daily deal site and consumers redeem the online discount vouchers of the remote places later on average. Our empirical results are significant and meaningful to understand new business model of daily deal web sites. There exist a number of other directions where this study could be extended. First, the data analysis can be expanded to cover longer period and wide range of products. Second, the extension to draw the managerial implications may well be explored. For instance, how different the redemptions are among the categories with the daily deal sites such as restaurant, café, travel services, beauty and spa and so forth? The impact of the communications through the mobile channel will be a nice area to explore in that the reminders through the mobile devices may help consumers decide to redeem their vouchers.

References


