Competitive Poaching in Search Advertising: A Randomized Field Experiment

Siddharth Bhattacharya, Jing Gong, Sunil Wattal
Fox School of Business, Temple University
{siddharth.bhattacharya, gong, swattal}@temple.edu

Abstract

A key strategy that firms are increasingly following in search advertising is to generate traffic by bidding on not only their own keywords but also competitors' keywords. This strategy, known as competitive poaching, is prevalent in multiple industries. However, little research has empirically examined the effectiveness of competitive poaching, and what factors increase its effectiveness. Moreover, which ad copy works best under this competitive setting remains an open question. The objective of this research is to examine the effect of ad copy variations with respect to competitor keywords on driving number of clicks. We further expect this relationship to be moderated by the quality of the competitor. We run a 5-week randomized field experiment in collaboration with a business school in Northeastern United States. Theoretically, our work contributes to the nascent field of effective ad copy design and competition in search advertising. Practical and managerial implications are discussed.

Keywords: Search advertising, competitive poaching, ad copy design, field experiment

1. Introduction

Online sponsored search advertising is growing faster than any other form of advertising and accounts for 35% of a $187 billion market by 2016 (Lunden 2015). Since search terms are based on consumers' interests and indicate their purchase intentions, firms can target consumers more accurately via sponsored search advertising. Search engines such as Google and Bing use auctions to sell their ad space. Advertisers submit bids for keywords based on their willingness to pay for every click on these keywords. Search engines then use a combination of submitted bids, the ad's click potential, and other ad quality measures to rank these ads on their search results page. Consumers generally assume that higher-positioned ads are of higher quality and thus are more likely to click top positioned ads (Arbatskaya 2007). This in turn increases competition for the top positions in sponsored search, which induces firms to compete for higher positions by increasing bids or bidding on more profitable keywords. Previous research has focused on various aspects of search advertising, including the importance of ad position (Ghose and Yang 2009, Arbatskaya 2007, Agarwal et al 2011, Athey and Elison 2011), search engine optimization (Weber and Zheng 2007), and the effect of competition (Agarwal et al 2011).

A key strategy that firms are increasingly following to optimize their search ads is to generate traffic by bidding on not only their own keywords but also competitors' keywords (Sayedi et al. 2014). This strategy, known as *competitive poaching*, is prevalent in multiple industries. For example, in the car retail market, we find big players bidding on each other's keywords (e.g., Mercedes poaching on BMW); in the technology sector, electronics brands may bid on keywords of others' electronic products; and an increasing number of universities bid on their competitors' keywords to steal traffic to their own websites. Despite a small body of analytical work examining competitive poaching (e.g., Sayedi et al. 2014, Desai et al. 2014, Du et al. 2017), little

research has empirically examined the effectiveness of competitive poaching, and what factors may increase its effectiveness.

A key item in a firm's toolkit to improve the effectiveness of search engine ads is the "ad copy" (defined as "text that aims at catching and holding the interest of the prospective buyer, and at persuading him or her to make a purchase," Business Dictionary 2017). An ad copy conveys the "unique selling proposition" for an ad, and if designed properly, can help increase click-through rates (CTR) and conversion rate (Animesh et al. 2011). Although the traditional (offline) advertising literature has examined what types of message framing work under various contexts (Putrevu and Lord 1994, Gotlieb and Sarel 1992 Pechmann and Stewart 1990), ad copy effectiveness in online advertising is still in its nascence. Only a few researchers have examined how ad copy variations may drive CTR (e.g., Animesh et al. 2011, Lee et al. 2017) in the context of online advertising. However, their focus has been on the effect on the focal ad itself and does not consider competitive poaching. Our work, to our knowledge, is the first attempt to understand the effectiveness of different types of ad copies in the context of competitive poaching where advertisers attempt to steal traffic from other competitors by poaching on their keywords.

The objective of our research is to examine the effectiveness of ad copy variations with respect to competitor keywords on driving number of clicks. Further, consumers take multiple factors into consideration, including the quality of the seller when deciding their purchase. Consumers may prefer products from high quality sellers to those from low quality sellers. We thus expect that, in the context of competitive poaching, the effectiveness of ad copy variations to vary across competitors with varying quality levels. We ask the following research questions:

(1) How does the variation in ad copies with respect to competitor keywords affect number of clicks in the context of competitive poaching in search advertising?

(2) How does the quality of competitor (proxied by its ranking) play a moderating role in the effect of ad copy variation on number of clicks?

To answer these research questions, we conduct two field experiments by running two search advertising campaigns on Google. In the first field experiment, we collaborate with a business school located in Northeastern United States, whose online MBA program is ranked among the top 25 according to U.S. News World report. Due to confidentiality agreement, we call this school as Bishop University in the rest of the paper. We run a randomized field experiment for a period of 4 months bidding on a list of competitor keywords, employing a 1*4 factorial design (details given in the **Experimental Design** section). In the field experiment, a user who searched one of the competitor keywords was randomly exposed to one of four ad copies of the focal business school. By randomly varying the ad copy, we intend to find which ad copy works under which context in driving click-throughs.

Our results suggest that when poaching from high-ranked competitors, vertical differentiator ad copies perform better than all other ad copies. We further find that, for high-ranked competitors prescriptive ad copy performs better than the control ad copy (although not as well as vertical differentiation) and its marginal effect is higher than that for low ranked competitors. On the other hand, when poaching from low-ranked competitors, horizontal differentiator ad copies perform better than all other ad copies.

Our reported results can serve as guidelines for firms or organizations to take more informed decisions about ad copy design based on which managers could optimize their strategies in

allocating ad budgets when bidding on competitor keywords. Theoretically, our work contributes to the still nascent field of online search advertising in IS, with specific focus on what types of ad copy designs work under the competitive poaching setting.

2. Literature Review

Search Advertising

Our study is mainly related to the following streams of literature on search advertising, including position (rank) effect, auction design, competition, and ad copy design.

First, prior literature has consistently shown that the click performance of search ads decreases with ad position (e.g., Arbatskaya 2007, Ghose and Yang 2009, Animesh et al. 2011), as consumers are more likely to choose ads near the beginning of an online directory (Hoque and Lohse 1999).

Second, a number of studies have focused on auction design and ranking algorithms. Weber and Zheng (2007) find that ad ranking based on a combination of submitted bids and ad relevance provides the highest revenue to the search engine. Liu et al. (2010) study the impact of different ranking policies and minimum bids on the bidding outcome when the advertisers differ in their click potential or preference. Xu et al. (2012) investigate the bidding incentives of different advertisers in the presence of organic listings.

A third stream of literature examines competition in the context of search advertising, and particularly, the effect of the quality of competing ads on the performance of the focal ad. Agarwal and Mukhopadhyay. (2016) show that competing high quality ad appearing above focal ad has a lower negative effect than competing lower quality ad. Further, they show that this effect of competing ad varies with position and the type of keyword. Jeziorski and IIya (2015)

show that while users choose to click on ads sequentially to maximize their expected utility, due to other competing ads, there is substantial substitution effect which leads to lower clicks than if there was no competition. Chiou and Tucker (2012) show that in a competitive environment when a parent firm allows affiliates to use their trademark, this leads to decrease in clicks on the parent firm's paid search; the effect however gets outweighed by increase in clicking on parent firm's unpaid links.

However, there has been limited research on how to design effective ad copies for better performance in the search advertising setting. Animesh et al. (2011) show how firms can differentiate themselves by their using ad copies as unique selling propositions and how ad copies, in combination with ad position and competition, can drive CTR. However, they only examine two variants of ad copies: a price copy (which contains messages highlighting price, e.g., "50% discount" or "lowest rate of interest") and a quality copy (which contains quality related messages such as "secure and confidential" and "trusted"). These two types of ad copies aim to target two types of consumers, i.e. price sensitive and quality sensitive consumers, respectively.

Traditionally, the literature on advertising has considered two broad categories of ad messages: informative and personality related. Informative ad messages may contain brand mentions, price, location, and product information, etc. (Resnik and Stern 1977). Personality related ad messages encompass various aspects of personality from emotion to humor to philanthropic messages (Porter and Golan 2006, Berger and Milkman 2012). Lee et al. (2017) use Facebook data to cluster ads according to whether ad copies are informative and/or personality related and then examine their effect on ad performance such as the number of likes and the number of shares. However, in the context of search advertising, there may be other variations of ad copies which

may work under various contexts and consumer types (Converted 2017). Moreover, while most of the prior studies only focus on ad copies for generic ads, we are not aware of any work in the context of competitive poaching.

As to the interplay between ad copy design and competition, there is limited work on how firms can effectively strategize to bid on competitor keywords and how ad copies should be designed to grab a portion of the competitor's market. Animesh et al. (2011) examine competitors around the focal ad (based on the similarity of ad copy) and their effect on CTR of the focal ad. However, their research focuses on the effect on the focal ad itself, and does not study competitive poaching. Similarly, (Sayedi et al. 2014), focus on analyzing budget constraint and firms' strategic behavior using an analytical framework. They show that, under budget constraints, smaller firms are more likely to bid on competitors' keywords than bigger firms, which may result in information asymmetry that leads to larger firms returning their ad budgets to traditional forms of (offline) advertising.

In summary, none of these prior studies have comprehensively examined how different variations in ad copy design affect the performance of search advertising in the context of competitive poaching, which is the focus of our study.

Ad Copy Variations and Hypothesis Development

Effective ad copy design is arguably one of the most essential aspects of marketers' "unique selling proposition" strategy. Although practice in industry gives guidelines as to how to categorize ad copy designs in search advertising (Converted 2017), there has been limited research in this area in the context of search advertising where consumers have both extremely low search costs and low search intensity (Animesh et al. 2011). Traditional literature in

advertising has examined a few categories of ad copy design. Based on these insights, we classify ad copies into the following broad categories.

Differentiator Ad Copy. Differentiator ad copies contain signaling words or phrases to highlight the unique attributes of the advertised product or brand. These ad copies can be broadly divided into vertical differentiation and horizontal differentiation (Tremblay and Polasky 2002): *vertical differentiation* relates to differences in a single attribute (such as quality) while *horizontal differentiation* relates to differences across multiple attributes that cannot be easily evaluated in terms of quality. Vertical differentiator ad copies appeal to quality seeking consumers (Animesh et al. 2011) who have a higher willingness to pay for high quality products. Research in consumer behavior shows that consumers have unique needs and product attribute preferences (Bell and Lattin 1998). It is these product attribute preferences (e.g., quality) that dictate consumer's search process. High quality seeking consumers have higher willingness to pay for higher quality products than for lower quality products (Desai 2001, Wolinsky 1983). Thus, while searching online, consumers with higher valuation for quality are more likely to search for high-quality brands than low-quality brands. Because quality seeking consumers will be more attracted towards ads which signal high quality, vertical differentiator ad copies would work better for keywords of high-ranked competitors (i.e., more likely to be searched by consumers seeking high quality). Thus, we hypothesize that:

H1: *In context of competitive poaching, vertical differentiator ad copies are more effective than other ad copies in terms of the number of clicks when poaching on keywords of high-quality competitors.*

In horizontal differentiation two products differ in the features that they highlight, however their prices are often same (very similar). Now different features appeal to different users depending

their preferences and choices are made accordingly. Thus, it's not the quality which drives decisions but rather different user preferences that drives purchase decisions. Relating this to the case of ads, horizontally differentiated ad copies would thus appeal to users with different preferences for similarly priced products (which don't necessarily signal any specific quality). Literature (Desai 2001, Levin and Johnson 1984, Wolinsky 1983). suggest that these types of consumers often search for low prices as long as their preferences are satisfied. Such consumers have lower valuation for quality than other non-quality attributes (such as price). Thus, these consumers will be more attracted towards ads which signal non-quality attributes. Therefore, horizontal differentiator ad copies would perform better for keywords of low-quality competitors (i.e., more likely to be searched by consumers seeking non-quality attributes) than vertical differentiator ad copies. Thus, we hypothesize that:

H2: *In context of competitive poaching, horizontal differentiator ad copies are more effective than vertical differentiator ad copies in terms of the number of clicks when poaching on keywords of low-ranked competitors.*

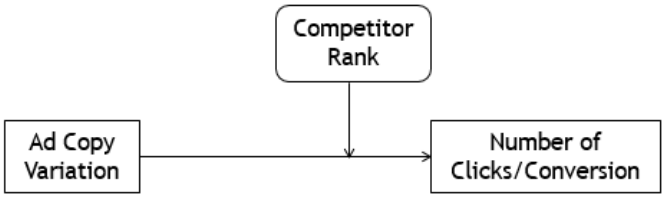
Prescriptive Ad Copy. Prescriptive ad copies contain messages that appeal to consumers through emotion, humor, small talk, etc. (i.e., various aspects of consumer's personality). **Prior studies in marketing suggest that the inclusion of such personality related content in messages can increase message sharing and overall engagement** (Porter and Golan, 2006, Berger and Milkman, 2012, Berger and Milkman 2005). Recent work in IS has also shown that the presence of personality, emotion, philanthropy, or small talk in message content can increase customer engagement and virality (Lee et al. 2017). Research in online reviews (Schindler et al 2012, Park et al 2007) has shown that these message cues (humor, emotion etc.) make customers more involved in their purchases and studies (Park et al 2007) have shown a correlation between

higher involvement and higher quality searches Hence, we hypothesize that:

H3: *In context of competitive poaching, prescriptive ad copies are more effective in terms of number of clicks when poaching on keywords of high-ranked competitors than low-ranked competitors.*

Call to Action Ad Copy (Control Group). Call to action ad copy does not communicate any of the above-mentioned attributes, nor does it signal quality (like the differentiator ad copy) or personality related content (emotion/humor/small talk, etc.). We expect call to action ad copies to receive the lowest number of clicks among different types of ad copies, and thereby serve as the baseline when comparing the performance of different types of ad copies.

Figure 1. Research Model



3. Experiment 1: Experimental Setup

In the first field experiment, we run a search advertising campaign on Google in collaboration with a business school located in Northeastern United States, whose online MBA program is ranked among the top 25 according to U.S. News World report. Due to the confidentiality agreement, we call this school as Bishop University in the rest of the paper. We choose the online MBA program of Bishop University as the context of this study. We focus on the higher

education space, a sector with arguably high intensity of competitive poaching, as universities are constantly poaching on each other's keywords to gain traffic.

We run a randomized field experiment for a period of 4 months by bidding on a list of competitor keywords focusing on online MBA programs (e.g. Villanova online MBA). In this field experiment, a user who searched one of the competitor keywords is randomly exposed to one of four ad copies of the focal business school. By randomly varying the ad copy, we intend to find which ad copy works under which context in driving click-throughs.

Competitor Keywords. We classify competitor keywords based on the quality of each competitor (proxied by school ranking). The school rankings are from the 2017 US News World report for online MBA programs. More specifically, we categorize the competing schools into 2 tiers: high-ranked (i.e., top 25 in US News Rankings) and low-ranked (i.e., 26 and below).

Ad Copies. To examine how effectiveness may vary by ad copy design, we propose four ad copies: vertical differentiator, horizontal differentiator, prescriptive, and call to action. Google requires that ad copies following a certain format: each ad copy can have two headings with 30 characters, a description line with 80 characters, and a URL with 15 characters. Adhering to these guidelines, we propose the following ad copies as listed in Table 1.

Table 1. Types of Ad Copies

Differentiator Ad Copy 1—Vertical Bishop University - Online MBA. bishop.edu/ Get an Online MBA from the Bishop School. Top Ranked School. World Class Faculty.	Prescriptive Ad Copy Bishop University - Online MBA. bishop.edu/ Get an Online MBA from the Bishop School. Discover Opportunities. Leave Transformed.
Differentiator Ad Copy 2—Horizontal Bishop University - Online MBA. bishop.edu/ Get an Online MBA from the Bishop School. Flexible Schedule. Mobile Friendly Format.	Call to Action Ad Copy (Baseline) Bishop University - Online MBA. bishop.edu/ Get an Online MBA from the Bishop School. Request for Information. Contact Us Today.

Each time a user searches for the specific keyword using Google's Search engine (e.g. Villanova online MBA), we randomly show one of the four ad copies (maintaining equal frequency among the ad copy variations) while controlling for other factors such as the screen position and the submitted bids. We then analyze ad performance as measured by the number of clicks.

4. Model

In our analysis, we would first like to look at the structure of the underlying data. We perform the following basic descriptive statistics as shown in Tables 1 and 2 and Figure 2. As can be seen from Figure 2, it's clear that our dependent variable, the number of clicks, is a count variable with a predominant number of zeros.

Figure 2 Distribution of Clicks

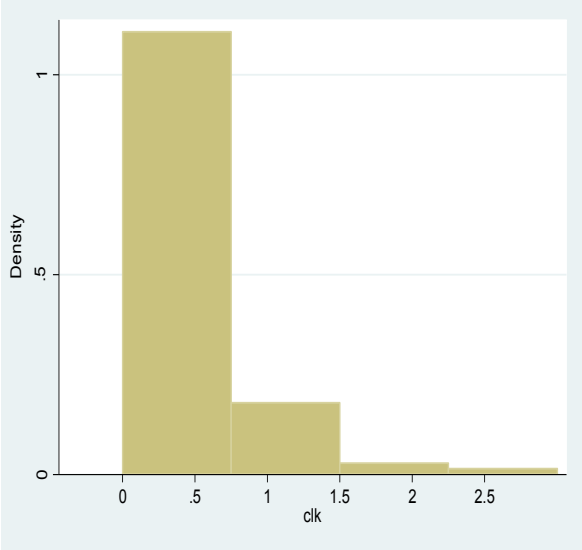


Table 1: Descriptive Statistics of ad copies by Rank

	Rank		
Ad copy	high	low	Total
c2Ac(control)	96	96	192
diff1	96	96	192
diff2	96	96	192
pres	96	96	192
Total	384	384	768

Table2: Descriptive Statistics of Clicks

Variable	Obs.	Mean	Std.Dev.	Min	Max
Click	768	0.214844	0.532577	0	3

Because the dependent variable is a count variable with a large number of zeros, we fit a Poisson regression.[1] Due to lack of over dispersion in the data, we choose a Poisson regression as given below, instead of a negative binomial regression. Besides ad copy variations, we also control for the screen position at which the ad is displayed (i.e., log(position)) and the number of impressions received by an ad (i.e., log(impressions)) following prior literature (e.g., Ghose and Yang 2009, Animesh et al 2011, Agarwal et al. 2011). The model specification is given below:

$$clicks_i \sim Poisson(\lambda_i)$$

$$Link: \log(\lambda_i) = \eta_i$$

$$\eta_i = \beta_0 + \beta_{1i} * adcopy_i + Controls + \varepsilon_i$$

Here we have defined a dummy variable, $adcopy_i$ where i=1 stands for call to action ad copy (control group) which is our base line, i=2 stands for vertical differentiator ad copy, i=3 stands for horizontal differentiator ad copy, and i=4 for prescriptive ad copy.

5. Results

Our results based on Poisson regression are given in Table 2 and lead to strong justification for our hypotheses. We perform the analysis separately for high-ranked and low-ranked schools. Columns 1 and 2 include dummies for ad copies (baseline being the control group, i.e., call to action ad copies) for high ranked schools and low ranked schools, respectively. Columns 3 and 4 control for location as the distance between the focal school (Bishop University) and the competitor school (in miles). Columns 5 and 6 control for time and school fixed effects in

[1] In the robustness checks section, we also consider a GLM specification (using both logit and probit) with number of clicks as DV. Results remain consistent.

addition to location. The marginal plots for high ranked schools (Figure 3) and low ranked schools (Figure 4) with predicted number of clicks for each type of ad copy are shown below (based on columns 5 and 6).

First, the results in Columns 1, 3, and 5 suggest that, when poaching from high-ranked competitors, vertical differentiator ad copies (differentiatorV) perform better than all other ad copies. For instance, the coefficient of 0.685 for differentiatorV in Column 1 indicates that the rate of clicks for the vertical differentiator ad copy is 1.98 times that for the control group (i.e., call to action ad copies). This suggests that, when poaching from high-ranked competitors, vertical differentiator ad copies (differentiatorV) perform better than all other ad copies, which supports H1. We further find that, for high-ranked schools, prescriptive ad copy performs better than the control ad copy (although not as well as vertical differentiation) and its marginal effect is higher than that for low ranked schools (see Columns 2, 4 and 6), thus supporting H3. Second, Columns 2, 4 and 6 indicate that, when poaching from low-ranked competitors, horizontal differentiator ad copies (differentiatorH) perform better than all other ad copies, thereby supporting H2. The results remain consistent after controlling for location, and time and school fixed effects. In all specifications, we control for the average position of the ad and the log of number of impressions following prior literature (e.g., Ghose and Yang 2009, Animesh et al 2011, Agarwal et al. 2011).

Table 3. Results (Dependent Variable: Number of Clicks)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools
differentiatorV	0.685***	0.348	0.688***	0.348	0.682***	0.303
	(0.242)	(0.219)	(0.241)	(0.221)	(0.255)	(0.203)
differentiatorH	-0.00593	0.563**	-0.00575	0.563**	0.00191	0.543**
	(0.422)	(0.268)	(0.424)	(0.265)	(0.424)	(0.251)
prescriptive	0.518*	0.493*	0.523*	0.490*	0.536**	0.508*

	(0.275)	(0.299)	(0.271)	(0.295)	(0.266)	(0.286)
averageposition	-0.0953	-0.0114	-0.0814	-0.00673	-0.204	0.344
	(0.128)	(0.131)	(0.112)	(0.140)	(0.205)	(0.438)
lnimp	1.098***	0.845***	1.135***	0.969***	1.036*	0.906**
	(0.163)	(0.181)	(0.186)	(0.197)	(0.587)	(0.401)
location	NO	NO	YES	YES	YES	YES
Time FE	NO	NO	NO	NO	YES	YES
School FE	NO	NO	NO	NO	YES	YES
cons	-5.716***	-4.976***	-5.817***	-5.227***	-4.718***	-7.383***
	(1.019)	(1.124)	(0.861)	(1.235)	(1.768)	(2.030)
N	384	384	384	384	384	384

Note: (1) Standard errors in parentheses; (2) * p<0.1, ** p<0.05, *** p<0.01

Figure 3: Marginal plot for High-Ranked Schools

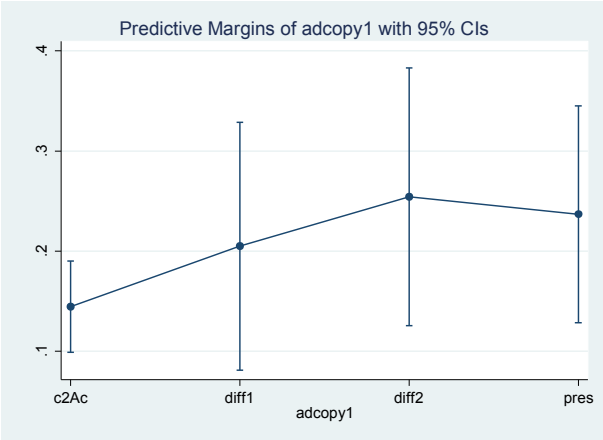
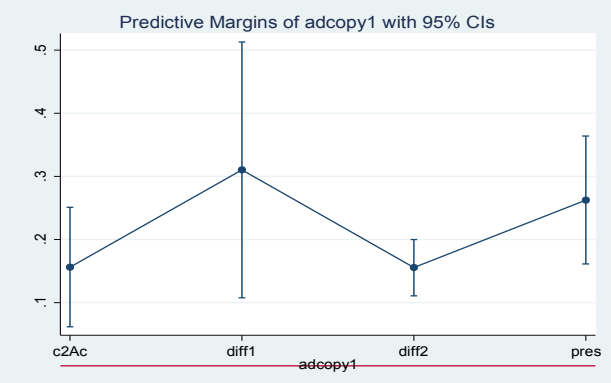


Figure 4: Marginal plot for Low-Ranked Schools



6. The Role of Competitor's Location and Ad

Competitor's Location

In the above specifications, we have controlled for the location of competitors and our results remain consistent. However, we might expect that location may play a role in consumers' click decision. Consumers who search for a keyword of a competitor (e.g., Villanova University) may have lower switching costs if the focal advertiser (i.e., Bishop University) is in the same location as the competitor than for a keyword of a competitor that is in different locations (Animesh et al. 2011). Research in other areas of IS such as crowdfunding (Lin et al. 2015) and electronic markets (Hortaçsu et al. 2009) has suggested existence of home bias ("the tendency that transactions are more likely to occur between parties in the same country or state, rather than outside", Lin et al. 2015). Thus, we hypothesize that:

H4: In the context of competitive poaching, poaching on keywords of competitors in same location is more effective in terms of number of clicks than poaching on keywords of competitors in different locations.

Competitor's Ad

Prior research has shown the effect of competition on the click through of the focal ad (Agarwal et al 2016). Consumers use the presence of high quality competitors as a signal of higher quality of the focal ad. However, we don't expect such an effect if the focal ad is surrounded by low quality competitors Thus, we hypothesize that

H5: In the context of competitive poaching, presence of competitor's own ad will lead to positive impact on poaching of keywords of high ranked competitors while having a negative impact on keywords of low ranked ones.

We thus introduce two new variables: ads presence (representing whether the competitor of Bishop University has an ad present on the results for its keyword or not) and ads_avg (representing the average position of the competitor's ad on the results for its keyword).

Results

The regression results, after controlling for competitor's location and ad, are reported in Table 4. First, results show that, for both high-ranked and low-ranked competitors, when the distance between the focal school and the competing school increases, the poaching traffic decreases across all ad copy variations. This strongly supports our H4, an indication of home bias in the context of competitive poaching.

Second, the coefficients of the ads presence suggest that, while for higher ranked schools, the presence of the competitor's ad on the result page of its keyword has a positive effect on the number of clicks attracted by the ad of Bishop University, for lower ranked schools, it has a negative effect. Thus, we have partial support for H5.

Table 4: Impact of Competitor's Location and Ad (Dependent Variable: Number of Clicks)

	(1)	(2)	(3)	(4)
VARIABLES	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools
differentiatorV	0.699***	0.345	0.698***	0.352*
	(0.238)	(0.214)	(0.234)	(0.213)
differentiatorH	-0.00696	0.599**	-0.00839	0.592**
	(0.423)	(0.251)	(0.425)	(0.239)
prescriptive	0.512*	0.485*	0.517*	0.486*
	(0.272)	(0.286)	(0.269)	(0.284)
averageposition	-0.0219	-0.0617	-0.0142	0.143
	(0.141)	(0.124)	(0.160)	(0.173)
lnimp	1.259***	1.018***	1.347***	1.129***
	(0.217)	(0.219)	(0.171)	(0.317)
location	-0.000146***	-0.000298***	-0.000186***	-0.000192***
	(0.000161)	(0.000368)	(0.0000867)	(0.000104)
ads_avg			-0.0465	0.0515
			(0.220)	(0.0896)

ads_presence			0.779** (0.320)	-0.817*** (0.295)
Controls	YES	YES	YES	YES
Time FE	NO	NO	YES	YES
School FE	NO	NO	YES	YES
cons	-6.656*** (1,252)	-5.832*** (1.300)	-7.578*** (1.315)	-6.273*** (1.949)
N	384	384	384	384

Note: (1) Standard errors in parentheses; (2) * p<0.1, ** p<0.05, *** p<0.01

7. Robustness Checks

To test the robustness of our data, we replicated our analyses using several alternate models. Specifically, we consider GLM model with both logit and probit specifications. Our DV remains number of clicks.

The results from a GLM model (with link as probit) are reported in Table 5, and the results from a GLM model (with link as logit) are reported in Table 6. These results concur with the results from the Poisson model (in Table 3).

Table 5: GLM Model (Probit) (Dependent Variable: number of clicks)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
VARIABLES	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools
differentiatorV	0.236** (0.108)	0.117 (0.119)	0.235** (0.108)	0.118 (0.119)	0.239** (0.110)	0.105 (0.123)
differentiatorH	-0.000465 (0.121)	0.195* (0.115)	0.000148 (0.121)	0.191* (0.115)	0.0154 (0.122)	0.195* (0.118)
prescriptive	0.178 (0.110)	0.167 (0.115)	0.180 (0.110)	0.166 (0.115)	0.189* (0.112)	0.182 (0.118)
averageposition	-0.0474 (0.0586)	0.0128 (0.0588)	-0.0470 (0.0585)	0.000780 (0.0585)	-0.0724 (0.109)	0.150 (0.109)
location			-0.0000400 (0.0000403)	-0.000111 (0.0000733)	0.0000177 (0.000301)	-0.0000663 (0.000163)
Time FE	NO	NO	NO	NO	YES	YES

School FE	NO	NO	NO	NO	YES	YES
cons	-2.511*** (0.276)	-2.751*** (0.279)	-2.476*** (0.278)	-2.600*** (0.292)	-2.342** (1.022)	-3.495*** (0.639)
N	384	384	384	384	384	384

Note: (1) Standard errors in parentheses; (2) * p<0.1, ** p<0.05, *** p<0.01

Table 6: GLM Model (logit) (Dependent Variable: number of clicks)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools	High-ranked schools	Low-ranked schools
differentiatorV	0.687** (0.319)	0.346 (0.353)	0.689** (0.319)	0.349 (0.353)	0.686** (0.320)	0.307 (0.355)
differentiatorH	-0.00229 (0.366)	0.571* (0.337)	-0.00110 (0.366)	0.567* (0.337)	0.00226 (0.367)	0.549 (0.338)
prescriptive	0.521 (0.327)	0.490 (0.340)	0.526 (0.327)	0.491 (0.340)	0.539 (0.330)	0.514 ().341)
averageposition	-0.127 (0.170)	0.0335 (0.171)	-0.123 (0.169)	-0.000858 (0.169)	-0.207 (0.315)	0.348 (0.311)
location			-0.000121 (0.000119)	-0.000333 (0.000211)	-0.0000940 (0.000895)	-0.000149 (0.000449)
Time FE	NO	NO	NO	NO	YES	YES
School FE	NO	NO	NO	NO	YES	YES
cons	-5.162*** (0.805)	-5.791*** (0.811)	-5.068*** (0.809)	-5-352*** (0.838)	-4.750 (3.088)	-7.568*** (1.801)
N	384	384	384	384	384	384

Note: (1) Standard errors in parentheses; (2) * p<0.1, ** p<0.05, *** p<0.01

In addition, we also control for the device that users use, which could be: desktop, mobile or tablet. The results remain consistent.

8. Experiment 2 (Work in Progress)

In our first experimental design, there are a few concerns that we would like to address. First, we have taken a single variation of each type of the ad copies. However, to understand the effect of

each type of ad copies, it is important that we consider multiple variations for each type of ad copies and check whether the results still concur. Second, the school of interest in our case (Bishop University) is a top-ranked school in the online MBA space, which may cause concerns regarding the generalizability of the findings. Hence, it would be interesting to also consider cases where the focal brand is not a top-ranked brand. Third, in practice, ad copies may include price-related information (e.g., "Get $25 less" or "Get 10% off," etc), which may be another important consideration when designing ad copies. Finally, there is a question of generalizability of our results to other sectors.

To overcome each of these shortcomings, we have started conducting second field experiment in collaboration with an automobile dealership which specializes in selling Audi car models. This dealership also utilize competitive poaching extensively by poaching from on other brands such as Mercedes Benz, Lexus, Kia, etc. The experiment is expected to run for two months.

Different from the first field experiment, there are several major differences in the second field experimental design. First, we include multiple variations for each type of ad copies. Second, the car dealer runs parallel campaigns where they use the same ad copies when bidding on their own keywords (in addition to competitors' keywords). This gives us an opportunity to analyze the effect of ad copy variations for their own keywords versus competitors' keywords to examine. Third, we introduce a new type of ad copy – a price copy – in this experiment in addition to the four types of ad copies considered in the first experiment. Fourth, the fact that Audi is an automobile brand with both competing brands of higher quality (such as Mercedes Benz) and competing brands of lower quality (such as Kia) alleviates the concern from our first experiment that Bishop University is a top-ranked school in the online MBA space and hence the results may not hold for a lower-ranked school. Finally, the context being a car dealer company alleviates the

generalizability concern of whether the results hold in other industries. The ad copies we consider are listed in Table 7.

Table 7. Experiment 2: Types of Ad Copies

Differentiator Ad Copy 1—Vertical [Headers and URL omitted] Variation 1: Get the 2018 Audi. Best-selling luxury car. Ranked #1 in comfort. Variation 2: Get the 2018 Audi. Best-selling luxury car. Ranked #1 in satisfaction.	Prescriptive Copy [Headers and URL omitted] Variation 1: Get the 2018 Audi. Have the power. Push the limits of expectation. Variation 2: Get the 2018 Audi. Feel the luxury. Have the power.
Differentiator Ad Copy 2—Horizontal [Headers and URL omitted] Variation 1: Get the 2018 Audi. Customized driving. Great adaptability. Variation 2: Get the 2018 Audi. Extreme versatility. Great driver assistance.	Price Ad Copy [Headers and URL omitted] Variation 1: Get the 2018 Audi. Great deals available. Lease starting at $380/month. Variation 2: Get the 2018 Audi. Competitive prices. lease starting at $380/month.
Call to Action Ad Copy (Baseline) [Headers and URL omitted] Get the 2018 Audi. Request a quote. Schedule a test drive. Get the 2018 Audi. Talk to a dealer. Schedule a test drive.	

9. Conclusion and Implications

Our results from the first field experiment give strong credence to our hypotheses. First, in support of H1, we found that vertical differentiator ad copies are more effective in terms of number of clicks when poaching on keywords of high-ranked competitors than low- ranked competitors. This is in line with the theory (Desai 2001, Wolinsky 1983) which suggests that quality seeking consumers are more attracted towards ads which signal high quality because these consumers have a higher willingness to pay for high quality products than consumers with non-quality seeking consumers. Second, we find that, when poaching from low-ranked competitors, horizontal differentiator ad copies perform better than all other ad copies, thereby supporting H2. This directly supports the theory that consumers that search for low-quality sellers may have lower valuation for quality than other non-quality attributes. Third, in support

for H3, we find that prescriptive ad copies are more effective when poaching on keywords of high-ranked competitors than low-ranked competitors. This supports the theory suggesting that consumers seeking high quality are more involved (Schindler et al 2012, Park et al 2007) and thus ad copies that contain these cues (like emotion, humor etc) will be more appealing to them, thereby increasing the probability of clicks (Lee et al. 2017). Finally, we expect home bias to exist among consumers, which should lead to higher poaching traffic from competitors located in the same location as the focal brand than from competitors located in different locations. This is exactly what we find as the distance increases the poaching traffic decreases supporting H4. Results remain robust when controlling for ad position, time and school fixed effects, device, etc., and also with other model specifications.

Theoretically, our work adds to the still nascent field of effective ad copy design in the sponsored search advertising environment. Only a few handful of IS researchers have started examining ad copy designs (e.g., Animesh et al. 2011). However, their focus is either solely on ad copy design or contexts different from the competitive poaching setting. With respect to the marketing literature, although there has been work on effective message framing, there is limited attention on ad copy designs in the competitive setting. This makes our work both novel and unique.

Our work also has strong implications for managers since they can use the insights from our study to understand what ad copy variations work under what context and thus make more informed decisions based on consumer type and intent. It would also enable them to optimize their strategies when allocating ad budgets when bidding on competitor keywords.

References

- Agarwal, Ashish, and Tridas Mukhopadhyay. 2016. "The Impact of Competing ads on Click Performance in Sponsored Search." *Information Systems Research* (27:3), pp.538-557.
- Agarwal, Ashish, Kartik Hosanagar, and Michael D. Smith. 2015. "Do organic results help or hurt sponsored search performance?" *Information Systems Research* (26.4), pp.695-713.
- Amaldoss, Wilfred, Preyas S. Desai, and Woochoel Shin. "Keyword search advertising and first-page bid estimates: A strategic analysis." Management Science 61.3 (2015): 507-519.
- Animesh, Animesh, Siva Viswanathan, and Ritu Agarwal. 2011. "Competing “creatively” in sponsored search markets: The effect of rank, differentiation strategy, and competition on performance." *Information Systems Research* (22.1), pp.153-169.
- Arbatskaya, Maria. "Ordered search.2007." *The RAND Journal of Economics* (38.1), pp. 119-126.
- Athey, Susan, and Glenn Ellison. "Position auctions with consumer search." The Quarterly Journal of Economics 126.3 (2011): 1213-1270.
- Bell, David R., and James M. Lattin.1998. "Shopping behavior and consumer preference for store price format: Why “large basket” shoppers prefer EDLP." *Marketing Science* (17.1), pp. 66-88.
- Berger, Jonah, and Katherine L. Milkman.2012. "What makes online content viral?" *Journal of marketing research* (49.2). pp. 192-205.

- Business Dictionary. 2017. “Advertising copy”, http://www.businessdictionary.com/definition/advertising-copy.html.
- Chiou, Lesley, and Catherine Tucker.2012. "How does the use of trademarks by third-party sellers affect online search?" *Marketing Science* (31.5), pp.819-837.
- Converted.2017. “AdWords Adcopy Variations – New Ways To Get Attention,” http://converted.co.uk /blog/ppc-management-tips/adwords-adcopy-variations-new-ways-to-get-attention.
- Desai, Preyas S. "Quality segmentation in spatial markets: When does cannibalization affect product line design?" Marketing Science 20.3 (2001): 265-283.
- Desai, Preyas S., Woochoel Shin, and Richard Staelin. "The company that you keep: when to buy a competitor's keyword." Marketing Science 33.4 (2014): 485-508.
- Desai, Preyas, Sunder Kekre, Suresh Radhakrishnan, and Kannan Srinivasan. "Product differentiation and commonality in design: Balancing revenue and cost drivers." Management Science 47.1 (2001): 37-51.
- Diehl, Kristin, Laura J. Kornish, and John G. Lynch.2003. "Smart agents: When lower search costs for quality information increase price sensitivity." Journal of Consumer Research (30.1), pp. 56-71.
- Du, Xiaomeng, et al. "Bidding for Multiple Keywords in Sponsored Search Advertising: Keyword Categories and Match Types." Information Systems Research (2017).
- Fukuda, S., et al.2001. "Solar B 8 and hep Neutrino Measurements from 1258 Days of Super-Kamiokande Data." Physical Review Letters (86.25), pp. 5651.
- Ghose, Anindya, and Sha Yang.2009. "An empirical analysis of search engine advertising: Sponsored search in electronic markets." Management Science (55.10), pp. 1605-1622.

- Gotlieb, Jerry B., and Dan Sarel. "The influence of type of advertisement, price, and source credibility on perceived quality." Journal of the Academy of Marketing Science 20.3 (1992): 253-260.
- Holbrook, Morris B., and John O'Shaughnessy.1984. "The role of emotion in advertising." Psychology & Marketing (1.2), pp. 45-64.
- Hoque, Abeer Y., and Gerald L. Lohse.1999. "An information search cost perspective for designing interfaces for electronic commerce." Journal of marketing research, pp. 387-394.
- Hortaçsu, Ali, F. Martínez-Jerez, and Jason Douglas. "The geography of trade in online transactions: Evidence from eBay and mercadolibre." American Economic Journal: Microeconomics 1.1 (2009): 53-74.
- https://techcrunch.com/2015/01/20/2015-ad-spend-rises-to-187b-digital-inches-closer-to-one-third-of-it/
- Jerath K, Ma L, Park YH, Srinivasan K. 2011. "A "position paradox" in sponsored search auctions." Marketing Science (30.4), pp. 612-627.
- Jeziorski, Przemyslaw, and Ilya Segal. "What makes them click: Empirical analysis of consumer demand for search advertising." American Economic Journal: Microeconomics 7.3 (2015): 24-53.
- Lee, Dokyun, Kartik Hosanagar, and Harikesh Nair. 2017. "Advertising content and consumer engagement on social media: evidence from Facebook." Management Science, forthcoming.

- Levin, I.P, Johnson R.D, Russo C.P. and Deldin P.J. 1985. "Framing effects in judgment tasks with varying amounts of information." Organizational behavior and human decision processes (36.3), pp. 362-377.
- Lin, Mingfeng, and Siva Viswanathan. "Home bias in online investments: An empirical study of an online crowdfunding market." Management Science 62.5 (2015): 1393-1414.
- Liu, De, Jianqing Chen, and Andrew B. Whinston. "Ex ante information and the design of keyword auctions." *Information Systems Research* 21.1 (2010): 133-153.
- Lynch Jr, John G., and Dan Ariely.2000. "Wine online: Search costs affect competition on price, quality, and distribution." Marketing Science (19.1), pp. 83-103.
- Moe, Wendy W. "Buying, searching, or browsing: Differentiating between online shoppers using in-store navigational clickstream." Journal of consumer psychology13.1-2 (2003): 29-39.
- Nelson, Phillip.1970. "Information and consumer behavior." Journal of Political Economy (78.2), pp. 311-329.
- Ortmaier T, Weiss H, Döbele S and Schreiber U. 2006. "Experiments on robot□assisted navigated drilling and milling of bones for pedicle screw placement." The International Journal of Medical Robotics and Computer Assisted Surgery (2.4), pp. 350-363.
- Park, Do-Hyung, Jumin Lee, and Ingoo Han. "The effect of on-line consumer reviews on consumer purchasing intention: The moderating role of involvement." International journal of electronic commerce 11.4 (2007): 125-148.
- Pechmann, Cornelia, and David W. Stewart.1990 "The effects of comparative advertising on attention, memory, and purchase intentions." Journal of Consumer Research (17.2), pp. 180-191.

- Phelps, Joseph E., et al. "Viral marketing or electronic word-of-mouth advertising: Examining consumer responses and motivations to pass along email." Journal of advertising research 44.4 (2004): 333-348.
- Porter, Lance, and Guy J. Golan. "From subservient chickens to brawny men: A comparison of viral advertising to television advertising." Journal of Interactive Advertising 6.2 (2006): 30-38.
- Putrevu, Sanjay, and Kenneth R. Lord.1994. "Comparative and non-comparative advertising: Attitudinal effects under cognitive and affective involvement conditions." Journal of Advertising (23.2), pp. 77-91.
- Resnik, Alan, and Bruce L. Stern.1977. "An analysis of information content in television advertising." The Journal of Marketing, pp. 50-53.
- Rutz, Oliver J., and Randolph E. Bucklin.2013. "Paid search advertising." Advanced Database Marketing, pp. 229-46.
- Sayedi, Amin, Kinshuk Jerath, and Kannan Srinivasan.2014 "Competitive poaching in sponsored search advertising and its strategic impact on traditional advertising." Marketing Science (33.4), pp. 586-608.
- Schindler, Robert M., and Barbara Bickart. "Perceived helpfulness of online consumer reviews: The role of message content and style." Journal of Consumer Behaviour 11.3 (2012): 234-243.
- Scot Duncan.2012. ”PPC Conversion Rate in Higher Ed”. Higher Education Marketting,http://www.higher-education-marketing.com/blog/ppc-conversion-rates-higher-ed

- Techcrunch. 2015. "2015 Ad Spend Rises To $187B, Digital Inches Closer To One Third Of It" https://techcrunch.com/2015/01/20/2015-ad-spend-rises-to-187b-digital-inches-closer-to-one-third-of-it/
- Tremblay, Victor J., and Stephen Polasky.2002. "Advertising with subjective horizontal and vertical product differentiation." Review of Industrial Organization (20.3), pp 253-265.
- Turnbull, Don, and Laura F. Bright.2008. "Advertising academia with sponsored search: an exploratory study examining the effectiveness of Google AdWords at the local and global level." International Journal of Electronic Business (6.2), pp. 149-171.
- Weber, Thomas A., and Zhiqiang Zheng.2007. "A model of search intermediaries and paid referrals." Information Systems Research (18.4), pp. 414-436.
- Wolinsky, Asher. "Prices as signals of product quality." The Review of Economic Studies 50.4 (1983): 647-658.
- Wolinsky, Asher.1983. "Prices as signals of product quality." The Review of Economic Studies 50.4 (50.4), pp. 647-658.
- WordStream. "Keyword Intent – The Secret to Attracting the Right Traffic." http://www.wordstream.com /keyword-intent
- Xu, Lizhen, Jianqing Chen, and Andrew Whinston. "Effects of the presence of organic listing in search advertising." Information Systems Research 23.4 (2012): 1284-1302.
- Yang, Sha, and Anindya Ghose.2010."Analyzing the relationship between organic and sponsored search advertising: Positive, negative, or zero interdependence?" Marketing Science (29.4), pp. 602-623.

- Yun Yoo, Chan.2011. "Interplay of message framing, keyword insertion and levels of product involvement in click-through of keyword search ads." International Journal of Advertising (30.3), pp. 399-424.