(a) Summary of the paper’s main contribution

Blake, Nosko, Tadelis’s paper “Consumer heterogeneity and paid search effectiveness: A large scale field experiment (2015)” found paid search term advertising on the brand name of a well-known brand e.g. “ebay” to be ineffective in increasing short term revenues. Big brand’s names usually appear through natural search after the paid search which is displayed at the top, hence customers who were going to go on the website anyway are being intercepted by those paid links.

Additionally, it was shown that non-brand search terms, e.g. “shoes”, were effective in gaining new users to the site. However, those new user’s purchase rates are low. Frequent users - who would have come on to the website anyway - also clicked on these links (and accounted for most of the advertising costs) with no effect on their spending. This heterogeneity of customers this is consistent with the informative view of advertising, that adverts only provide information on products, adding very weak persuasive power.

Given the findings, ROI for both brand and non-brand keyword ads were estimated to be negative in the short term. However, it causes new users to visit the site and could potentially deter competitors, so the effects for the longer term are unknown.

(b) The methodology used

To test the hypothesis for brand search terms, ebay turned off paid advertising that contain the word ‘ebay’ on MSN/Bing in March 2012. After using clicks from google to control for seasonal factors 99.5% of the foregone traffic was found to come though natural search.

For the non-brand experiment, U.S buyers were separated into 210 geographic Design Market Areas DMAs. In May 2012 Ads were turned off in 30% of DMAs, other DMAs were used as a control group. Users were separated into 11 segments by purchase frequency, where m=0 indexes a new buyer and m=1 indexes the user having purchased once, etc. Differences in Differences regression was then used to estimate eleven treatment effects of turning adverts on. Note that sales were attributed by each segment, and are dummies for Ads being on, time, DMA and segment.

DnD:

ROI was calculated as:

Where is estimated US 2012 Sales given ad spend =$2880.64m, and is estimated spend on US 2010 search ads =$51m. is the estimate of change of from turning on Ads, (i.e. a weighted average of the variables of interest in the DnD regression).

(c) Based on this, how would you approach ad spending

We provide two strategies for a company to approach ad spending to deliver both rapid returns and sustained growth:

* **Shift spending from paid media to owned and earned media.** Users substituted paid search clicks for natural search clicks when querying brands. Companies could reallocate spending from low-performing paid search and invest in maximizing the value from owned media (such as a company website) and earned media (such as a blogger writing about your product) to boost organic Search-Engine Optimisation, then conduct a thorough technical site audit which aims to drive higher value for the corporate brand. Note, paid search for brand queries could be still effective for small/new entities that have no brand recognition.
* **Measure impact of paid media for non-brand keywords on granular level.** The majority of paid non-brand clicks may not directly result in incremental sales; new/infrequent users were positively influenced by ads, but frequent users whose buying behavior was not influenced by ads accounted for most of the expenses. A company’s digital buy can have many keywords and display ads by size, type, and placement, each with their own individual performance information. In such a data-rich environment, granular level analysis will identify significantly more value than reliance on misleading averages.

Overall, companies should stop paying for the majority of the poor-performing keywords, only keeping important ones for strategic reasons.

Extra

Since the CPC model means that ad spend increases as consumers with purchase intensions go on ebay, ad spend will rise along with sales, leading to the endogeneity of the independent variable, spend. Naively regressing sales on ad spending with OLS will result in biased estimates of the true effect of ad spend.

This endogeneity of log(spend) problem is alleviated by estimating it using the IV a dummy variable for weather ads were being paid for or not in a region (made from the interaction of a dummy for whether the test was running and a dummy whether that region keeping search spending on during the test).

OLS:

IV: First stage regression:

IV: Second stage:

To obtain a comparable measure for OLS and IV, their coefficients are multiplied by the coefficient in the first stage IV equation.