Measuring ROI on Sponsored Search Ads
B8679: Digital Marketing (Prof. Kinshuk Jerath)

Bob and Myra are in the marketing analytics team at Bazaar, the leading online retailer in the country (with the website Bazaar.com). They are reviewing their recent advertising reports. As he is looking over the reports, Bob is smiling to himself. Sunil, the newly hired data scientist, is sitting in on the meeting.

Myra: Sunil, let me give you some background on our online advertising strategy. We do both display advertising and search engine advertising. Right now, we are inspecting the reports on our recent paid search efforts. We run paid search ads on the two major search engines, Google and Bing. We classify the keywords that we show ads in response to into two broad categories: branded keywords and non-branded keywords. Branded keywords include keywords such as "Bazaar," "Bazaar shoes," "Bazaar guitar," etc., that have the Bazaar name in them. This is how a typical page of results looks like on Google after a branded keyword search. [Presents **Figure 1**.] Non-branded keywords include keywords such as "shoes," "guitar," etc. that do not have our brand name in them. Our strategies of targeting ads, the keywords that we use, the ad copies that we use, and the mix of potential customers that we get to our website are virtually identical for Google and Bing. The only real difference is that our campaign on Bing is much smaller in scale compared to our campaign on Google. The objective of this meeting is to calculate the ROI on our sponsored search ads for branded keywords on Google.

Bob: Myra, I am very pleased with these numbers for sponsored search advertising for branded keywords on Google. [Presents **Table 1**.] You can see that these data are for 12 weeks. As you know, we were planning to run our sponsored ad campaign for the whole 12 weeks but there was technical glitch in our systems starting week 10 due to which we had to suspend our ad campaign on Google (though our Bing campaign was unaffected by this). So I am ignoring the numbers of weeks 10, 11 and 12 because no sponsored search advertising was going on at that time. Now take a look at the data from weeks 1 to 9 of weekly ad traffic numbers to Bazaar.com from consumers clicking on sponsored ad links and organic links that appear on Google after a branded keyword is searched. This data reveals that we obtain about 20% of our traffic for these branded keywords through the sponsored ads that we show on Google.

Myra: So just to clarify, if the consumer searches a keyword with our brand name in it, then they are shown a sponsored ad from us. Of course, since the search term includes our brand name, Google displays a link, or even multiple links, to our website in the organic results as well. The click-through numbers are for users who visit Bazaar.com by clicking on those two types of links, right?

Bob: Yes, that is exactly right. I just did an ROI analysis and we are getting amazing ROI on this ad spend. Here is how it goes. We know that the average cost per click (CPC) for a sponsored click is $0.6. Once a consumer lands on Bazaar.com, her average probability of making a purchase from our website is 12% and our average margin per conversion is $21. So that leads to average "revenue per click" of 0.12*$21 = $2.52, which implies an ROI of ($2.52–$0.6)/($0.6) = 320.0%.

Myra: Bob, wow! That's a really high ROI number. I don't think any of our other advertising channels has ROI numbers anything close to that. That makes me suspicious.

Bob: Come on, Myra! I just did the calculation in front of you. Numbers don't lie, do they?

Myra: Of course not, Bob. Our team is all about the analytics. But I think we need to be more careful in doing the analysis. My main concern is that these keyword searches already include the name of our company in it. These people seem to be already aware and actively looking for our website. I wonder if we even need to show the sponsored ads to them.

Bob: What do you mean by that?

Myra: Suppose a consumer used the search term "Bazaar shoes" and from the results clicked on our sponsored ad. If the ad weren't there, my guess is that this consumer would be very likely to simply click on our link in the organic list. Then we would get the same consumer for free. Once at the website, we know that the conversion probability and margin per conversion numbers are the same for all consumers irrespective of how they landed up at the website.

Bob: That's a good point, Myra. I need to think more about this. I love it when you play the "devil's advocate." You always make me think. But if we don't put our own sponsored ad out there, maybe a competitor will put theirs', and we will end up losing potential customers.

Myra: That is indeed possible. But someone who is looking for us specifically is quite likely to ignore the competitor's ad and simply go to the organic link for our website. After all, their choice of search term indicates that they want to come to our website. And we are the largest online retailer in the country. Furthermore, quite often competitors do not even advertise on keywords that explicitly include the name of our website. Nevertheless, there might be leakage to competitors if we stop doing sponsored search advertising.

Bob: These arguments certainly make sense. But ultimately, it is an empirical question.

Myra: I agree with that. You know what, I think we might be able to answer this question. What if we compare data from the first 9 weeks to data from the last 3 weeks when no sponsored advertising was going on due to a completely non-strategic reason?

Bob: Oh, I think what you want to say is that this data would help us to understand what the impact of stopping sponsored search advertising for these keywords would be. That's brilliant! And since this interruption was caused by a technical glitch and not any strategic decisions on our side, it would be safe to call this a "natural experiment."

Myra: Yes, exactly, Bob! But there still may be one problem with this analysis. What if the first 9 weeks were systematically different from the last 3 weeks? I wonder if we can detect that and control for that if needed.

Just then, Chung, the intern, walks in, interrupting Myra.

Chung: Hi Bob and Myra! The traffic data for our sponsored and organic traffic for branded keywords on Bing for Weeks 1 to 12 just came in. Here it is. [Presents **Table 2**.] Oh, I almost forgot! The rep from our advertising agency just came in and is waiting for you in the lobby.
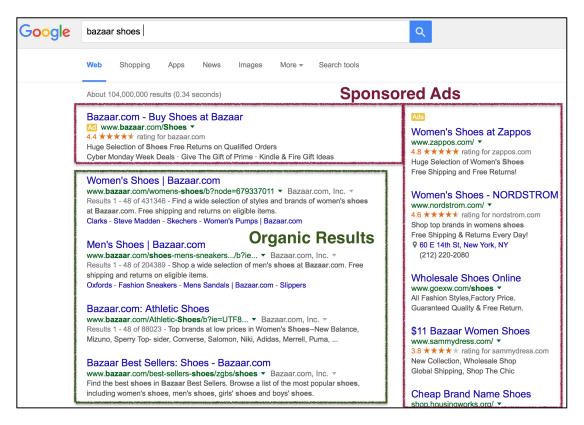
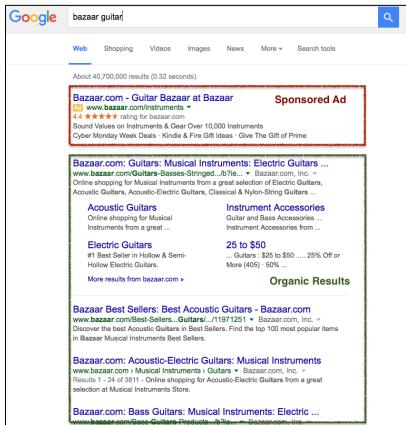Bob and Myra get up to leave to meet the sales representative.

Bob: Sunil, Myra and I need to step out for some time. Myra made some good points about measuring ad spend ROI on Google. We'll be back in about 30 minutes. Please could you run this analysis in the meantime and we will discuss the results when we are back.

Sunil: Certainly, Bob! This sounds very exciting!

Sunil was on board with Bob and Myra's thinking, but knew that he had to run the ROI analysis carefully. He was eager to impress his new colleagues. What analysis should he run?

Figure 1: Screenshots of results for some typical branded keyword searches on Google

Table 1: Weekly traffic from Google by origin of click (for branded keywords searches only)

Week	1	2	3	4	5	6	7	8	9	10	11	12
Sponsored	32,269	31,951	32,143	31,417	31,194	31,576	30,951	30,611	30,401	0	0	0
Organic	127,876	128,169	125,717	126,264	123,871	124,053	126,105	123,064	121,637	150,188	148,658	146,584

Table 2: Weekly traffic from Bing by origin of click (for branded keywords searches only)

Week	1	2	3	4	5	6	7	8	9	10	11	12
Sponsored	3,965	3,984	3,960	3,952	3,874	3,932	3,890	3,883	3,843	3,815	3,754	3,754
Organic	15,805	15,964	15,815	15,810	15,633	15,797	15,462	15,309	15,499	15,185	15,159	15,036

[Tables 1 and 2 are available in an Excel file on Canvas under today's date in Calendar view.]