Randomization we can explain to advertisers

Redacted@

Background

There are a few important metrics to advertisers we need to be cognizant of if we want to launch randomization (and especially if we aim to use these as a way to replace format pricing):

Average Position - The average *auction position* (not page position) for the keyword over the auctions it has participated in. For example, if it was the top ad on the page in the bottom slot, and the second ad on the page in the top slot on another query, Avg Pos = (1 + 2) / 2 = 1.5.

Impression Share - Impressions (in any slot) / Queries the advertiser could have shown on. Our logic for determining where the advertiser could have shown is not exactly great - basically based on a rough simulation and a limited slicing of rejected ads that sort of ask the question "where could the advertiser have shown if the multiplied their bid by X?", where I think X is 10. Budgets are accounted for, but XBT is not.

Click Share (Not launched yet) - SUM(pnpCTR of shown impressions) / SUM(Max possible expected clicks). The denominator of the metric is computed by simulating the maximum clicks the advertiser could get at the maximum bid (using a methodology similar to bid landscapes) and if they had full and relevant extension coverage.

What are some relevant things we communicate?
- The ad with the highest Ad Rank gets the highest position (auction position)
- NB: We used to say "you pay the minimum to beat the runner up", but now we just say that "your CPC is based on your competition and the Ad Rank thresholds." This gives us freedom to do things like config pricing.

Requirements

We need a mechanism advertisers can grok, and that advertisers perceive as fair and logical. I am willing to make some changes to our external documentation, but bonus points go to a mechanism which fits within the Help Center rewrite we just did (summary of rewrite).

What will advertisers expect?
- Impression share is non-decreasing in bid
- Click share is non-decreasing in bid
- If Impression share is maxed out, Average Position is non-decreasing in bid

Commented [1]: Really? Advertisers care about this metric? How can that possibly be useful if not conditioned on slot?

Commented [2]: +1.

Commented [3]: I agree this is not a great metric, but there are lots of folks that care.

It is sliceable by slot, but even if we restrict to slot, issues remain when triggering on new queries.

Commented [4]: Is this not something like current_impressions / max_possible_impressions?

Commented [5]: basically, yes

Commented [6]: So jacking up the bid to an arbitrarily large value?

Commented [7]: yes

Commented [8]: Doesn't format pricing violate it? Or was it really "you pay the minimum required to keep the current allocation". But that seems equivalent to saying we don't first price.

Commented [9]: format pricing doesn't violate this - formats lower your LTV
we also say "you pay the minimum necessary to maintain your position and extensions"

- - The IS maxed condition is important - average position can fall if an advertiser raises their bid and suddenly becomes eligible for a bunch more queries but shows lower on the page
- Adding extensions should improve their accounts. This means they should be able to get the same number of clicks for cheaper or the same cost. Impression share, Click share, or Avg. Position should not decrease because an advertiser adds extensions and changes nothing else.

What are some other important considerations?
- Smooth click cost curves (a wide variety of prices and click volumes) which are convex
  - At the same time, we don't want them to be too smooth. We need some discreteness so that advertisers aren't always paying their bid. Otherwise, they might perceive us to be running a first price auction, which will be really harmful.
  - You can lower your bid to get fewer expected clicks at better ROI. As you get more expected volume, your ROI falls.
- Good incentives
  - No incentives to try and game lower positions like we had pre Alpha Red (can't get more clicks for less cost in a lower position)
  - No incentives to opt out of formats, and ideally a strong incentive to opt in to them
  - No "Dyna" incentive issue - the top advertiser shouldn't be able to arbitrarily increase their bid and cause lower advertisers to lose clicks or impressions
  - Incentives for lower advertisers to bid up, and also not to free ride. When we bump Top-1 down, we give Top-2 something for free, which creates less incentive to raise bids. We need to account for these free bump-up click (e.g. with higher probabilities for moving them down a position, or as part of their click-cost curve). Also, Top-2 can potentially raise their bid, and get more clicks for no change in CPC (the Top-1 person just gets bumped down more). But, then if they cross the bid to win Top-1, they'll get a click increase for a large cost increase. There needs to be smoothness for them here and more clicks should lower ROI.
- Easy to tune, with the ability to raise prices (shift the curve upwards or make it steeper at the higher end) in small increments over time (AKA "inflation")
- We don't want to have to say "we randomize" - that will have perception problems

We are exploring these mechanisms to replace format pricing with something as powerful, but which doesn't have the format opt out incentives. So, some important product direction:
- There isn't a "reserve pricing problem." We aren't looking to price singletons.
- We win by leveraging the existing "vanilla" second prices, but then closing the gap between advertisers (headroom), especially in Top-1.
- Deciding which ads we show has major quality and efficiency implications, and so we want to try to keep the ads we show constant. Changing the UI of these ads (formats and position) has good tradeoffs, and we should be happy to change those up for price discovery and revenue.

Commented [10]: Just to confirm: IS maxed out does not mean that all impressions are in top right? To max out, you can still end up with a mix of top and bottom impressions?

If so I see one problem here: what about the case where they marginally raise their bids and a bunch of bot1 impressions now migrate to top4, thus lowering the average position. This can happen even in situations where the IS is maxed out no?

Commented [11]: Yes.

Bottom 1 is position 5 and Top-4 is position 4 in your example, so Avg Pos will go up.

Commented [12]: What? Then why did we even entertain fractional formats to begin with?

Commented [13]: Because it seemed like a simple way to get some nice gains. All of these properties are trade-offs we can make. In fractional formats, it didn't seem like the "pay your bid" case would be the dominant thing, but here it may be more problematic and we are building a new system anyway so it is worth thinking about this property from the beginning.

Commented [14]: one nice thing about the randomization mechanism is that we can make a very clean statement (if we want to) that adding formats should give you more clicks at the same CPC

Commented [15]: agree. see later in the doc for a similar comment.

Commented [16]: I suppose this term is important here. Without it, Format Pricing and OC allow that.

Commented [17]: I agree The OC has this issue a bit, but they do have a higher cost for this gaming.

Commented [18]: We have this problem with XBT today without the pricing fix, with the difference that we bump Top1 out instead of down.

Commented [19]: Then we should quickly change our wording in all our docs and KRs. I think if we use the work Expectation instead of randomization it would do the trick.

Commented [20]: makes sense

Commented [21]: would we have to say that to advertisers too? does that make sense to them?

Commented [22]: if we say things like "we run an auction focused on clicks - we give the most expected clicks to the highest ranked advertiser, and so on" then, yes, I think we can tell a good story. if i have to say "we randomly disable you if you don't bid high enough" then I'm going to have another bad year at GMN ;)