Ron Berman – Abstract

<u>Beyond the Last Touch: Attribution in Online Advertising</u>

Advertisers who run online advertising campaigns often utilize multiple publishers concurrently to deliver ads. In these campaigns advertisers predominantly compensate publishers based on effort (CPM) or performance (CPA) and a process known as Last-Touch attribution. Using an analytical model of an online campaign we show that CPA schemes cause moral-hazard while the existence of a baseline conversion rate by consumers may create adverse selection. The analysis identifies two strategies publishers may use in equilibrium – free-riding on other publishers and exploitation of the baseline conversion rate of consumers.

Our results show that when no attribution is being used CPM compensation is more beneficial to the advertiser than CPA payment as a result of free-riding on other's efforts. When an attribution process is added to the campaign, it creates a contest between the publishers and as a result has potential to improve the advertiser's profits when no baseline exists. Specifically, we show that last-touch attribution can be beneficial for CPA campaigns when the process is not too accurate or when advertising exhibits concavity in its effects on consumers. As the process breaks down for lower noise, however, we develop an attribution method based on the Shapley value that can be beneficial under flexible campaign specifications.

To resolve adverse selection created by the baseline we propose that the advertiser will require publishers to run an experiment as proof of effectiveness. Although this experiment trades-off gaining additional information about the baseline with loss of revenue from reduced advertising, we find that using experimentation and the Shapley value outperforms campaigns using CPM payment or Last-Touch attribution.

Using data from a large scale online campaign we apply the model's insights and show evidence for baseline exploitation. An estimate of the publishers' Shapley value is then used to distinguish effective publishers from the exploiting ones, and can be used to aid advertisers to better optimize their campaigns.