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ATTRIBUTION AND COMPENSATION DESIGN IN ONLINE ADVERTISING

This paper studies how the attribution algorithms used in online ad auctions affect the strategic interactions between advertisers and publishers, and it investigates optimal attribution strategies for advertisers. Because online advertisers typically advertise with several publishers to increase their reach, users may be exposed to ads from multiple publishers before converting. The attribution challenge for an advertiser is to measure the contributions of each publisher's advertising on conversions. These attributed conversion measures are crucial because they serve as inputs into the algorithms that advertisers use to determine bids in future ad auctions. The attribution challenge is aggravated by the fact that publishers typically have access to more information than advertisers, such as user behavior on their sites. This information asymmetry can lead to a moral hazard problem: publishers can exploit their information advantage to target ads to users who are likely to result in attributed conversions, rather than to users with large incremental ad effects. To investigate this misalignment of interests between advertisers and publishers, I cast the attribution problem as an incentive design problem. Using a structural model, I first characterize the dynamic incentives created by standard attribution algorithms and derive the advertiser's optimal strategy. I find that the advertiser's optimal strategy takes the form of team incentives, where each publisher is compensated only when a conversion is preceded by an ad impression by only that publisher. Counterfactual analysis shows that the optimal strategy increases the advertiser's ROI on the order of 20-40% compared with standard attribution algorithms. The findings highlight the importance of considering the dynamic incentives that measurement tools generate.