The dynamic impact of shocks on clickthrough and conversion rates of paid search advertisements.

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We develop a dynamic Bayesian model for clickthrough and conversion rates of paid search advertisements in Google. Clickthrough and conversion rates are subject to changes over time, due to, for instance, changes in the tastes and attitudes of consumers or the launch of a new product. Gaining insight into these dynamics of ad performance is crucial for advertisers to develop an effective search engine advertising (SEA) strategy. In this paper, we propose a model especially suited to deal with dynamic SEA environments; the model allows for time-varying parameters, seasonal effects, data sparsity, missing data, position endogeneity and unobserved cross-sectional heterogeneity. Moreover, the model allows for shocks on different types of ads (e.g. brand-specific versus generic ads) to have different dynamic effects on ad performance (e.g. permanent versus transitory).

We illustrate the model using a dataset of a Dutch online retailer that sells laptops. We find evidence of substantial time variation in clickthrough and conversion probabilities, indicating that a dynamic bidding strategy is more profitable than a static strategy. Furthermore, shocks have mostly a permanent effect on clickthrough rates; this holds for common shocks, brand-level shocks and retailer-level shocks. For conversion rates we find mixed results. Whereas common shocks, brand-level shocks on Microsoft ads, and retailer-level shocks have a permanent effect on conversion rates, brand-level shocks on ads of, for instance, MSI and Apple have a more transitory effect.

The managerial implications of this paper are threefold. First, advertisers can use the model to obtain accurate daily estimates of clickthrough and conversion probabilities of individual ads. These estimates can be used to set bids and design text ads and landing pages. Second, advertisers can examine the extent of dynamics in their SEA environment, to determine how often their bidding strategy should be revised. Finally, advertisers that manage large ad portfolios can use the expected persistence and influence of shocks to prioritize ads that need attention.