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Lagged Effects of On-line Promotions and Advertising

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Long term effects on marketing dynamics has been one of the major topics of quantitative marketing research in the last few decades (Bruce et al. 2016). With the development of digital marketing media, data availability has become vastly available in real time thus facilitating experimentation with effects of different communication impulses on sales and other marketing variables. In real world, a digital marketing campaign is often accompanied by use of traditional media requiring accounting of effects of such media to be included in modelling. Smaller companies that are usually not able to afford traditional media costs are mostly investing their communication budgets in digital media.

This paper deals with measuring the effects of different shapes of advertising pulses on online shop sales of premium cosmetics products. In an experiment, we studied the effects of different depths (20-50% off retail price), lengths (1,3 and 7 days) and timings (day of week) of on-line sales promotion on Facebook and google adwords on on-line sales. A CRM database was used to send notifications of the upcoming promotion to 3000 active (bought at least twice in last year) customers. A second set of communication impulses targeted at increased awareness was launched separately (with no supporting promotions) to assess whether advertising has a longer effect on page views and sales than sales promotions (Scutaru 2010).

The stationarity of sales was tested using the Dickey-Fuller unit roots of sales and page visits time series.

Impulse impact carryover was calculated using Koyck geometric decay (Clarke, 1976) and Dekimpe and Hansens multivariate persistence model (1993). Resolution of time series was hour and day.

Our goal was to assess the optimal advertising expenditure assuming the effects of a marketing communication decays over time (Bratina, 2011) as well as frequency and timing of direct e-mail communication. 300 time series in 18 experimental settings have been analysed.

Results confirm exponential decay of sales and page visits time series when promotion was used while zero effect on sales and an exponential decay on page visits time series when awareness advertising was used. Anticipated direct mail messages has almost no effect, implying that a direct e-mail needs to be actionable at time of delivery. The higher the discount, the higher the response rate as already proven by several on-line and off-line marketing response modelling papers.

Keywords: persistence modelling, time series analysis, advertising effects, sales response modelling