National Time Series Multiple Regression Analysis Yields Actionable Results for Maximizing Return on Ad Spend (ROAS) by Controlling the Allocation to Media Types

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Abstract:

Marketers for decades have been using Marketing Mix Modeling (MMM), which is performed market by market and the results derived at a national level by attributing more ROAS to those media over-delivering audiences (or investing the most money per capita) in the same market/weeks as those in which greatest sales increases occurred. This procedure is intensive in terms of assembling the right data, and data errors are known to occur. A simpler procedure would be to do the same type of analysis at a national level, extending the length of time measured so as to maintain a large number of observations. Furthering the desire for the maximum number of observations, a national analysis could perform the procedure not for one brand or advertiser – typical for MMM – but for every brand and advertiser in a product category, or in several of the largest product categories. This paper reports the findings of such a study, conducted over a large span of time, ad spend, and sales. The study discovered a number of relevant strong patterns before they were reported by others, and indeed the results were corroborated by advertisers and agencies who had found out the same things by in-market testing.

Background:

Vast shifts in media advertising investments have been occurring, especially since circa 2010. Digital media, especially Google and Facebook, have seen extraordinary economic success, while other media have stopped growing or have receded. It is has been known for a long time that there is a diminishing return curve in making media advertising investments in any given media type, which appears partially as a result of topping out in terms of reach, but may also represent a saturation effect in terms of frequency as well. The question was, with the billions of incremental ad dollars flowing into Digital, especially into two specific media channels, had advertisers gone too far in making those shifts?

Objectives:

1. To determine if the national time series methodology brings back valuable incremental information, especially by its multi-advertiser coverage, additive to what the industry is learning from use of its other techniques i.e. MMM, MultiTouch Attribution (MTA), singlesource, Random Control Trials (RCTs), in-market testing of other sorts, etc.
2. To compare ad media investment trends to the apparent ROAS effects of each media type and in terms of the synergy within specific media mixes, so as to gain insight leading to improved investment guidance.

Methodology:

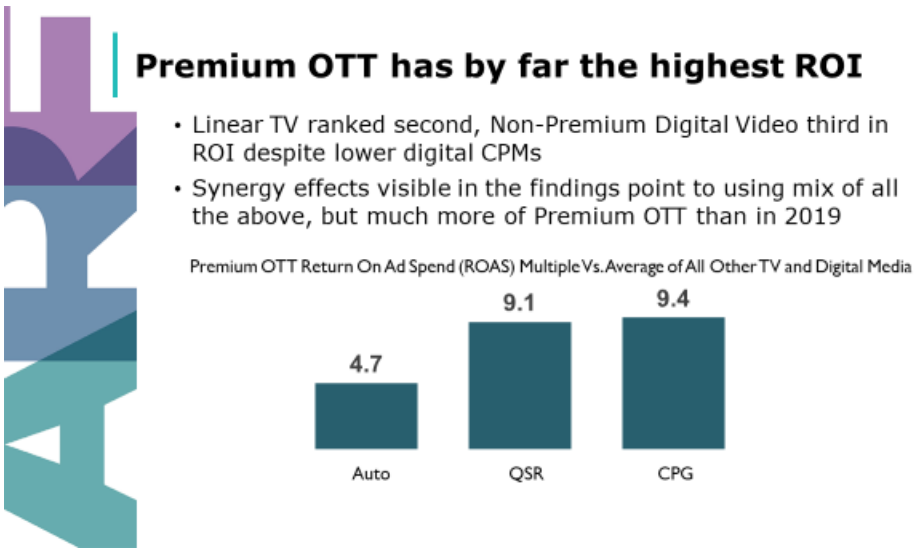
1. Three verticals were identified as lending themselves to the U.S. national time series analysis intended: CPG, Automotive, and QSR (Quick Service Restaurants). This was as a result of having massive factual store sales data for CPG from IRI, equally massive factual sales data for Automotive from Polk (today called IHS Markit), and an agreed currency in QSR consisting of NPD CREST panel data anchored by publicly reported hard sales records from QSR chains.
2. Hard data on adspend from Standard Media Index was instrumental to the study, which would never have been worth attempting before SMI came into existence. SMI represents a pooling of factual data from agencies representing the lion's share of national advertising investments.
3. Two types of multiple regression analysis were applied, one straightforward based on cumulative results, and the other marginal utility, forecasting the effect of the next million dollars spent based on the shape of the dose response curve. In both cases, standard Microsoft Excel extensions were used, i.e. the modelling involved no "black boxes". Synergy effects were studied by regressing combinations of media. Theoretical reoptimization of actual spend patterns was achieved by R scripts which tested thousands of media mixes to find the ones yielding the highest ROAS.
4. The study was conducted by months over the period January 1, 2014 through June 30, 2019, a 5.5 year period. A total of $48 billion in adspend was correlated with $2.2 trillion dollars in sales. This was for the largest advertisers, the ones spending over a quarter of a billion dollars over this period in the U.S. in these media. The study focused on Television and Digital media, each broken down into types. The three national types of greatest interest were:
    a. Television

b. Premium Over The Top (OTT)
c. Non-Premium OTT

These are all video media. Television includes two major types, broadcast and cable networks, as well as a smaller type, syndication. Premium OTT consists of the streaming versions of the broadcast and cable networks as well as a small number of other advertising supported OTT networks drawing upon the same creative community as the networks, such as Hulu, Tubi, Pluto, IMDb, et al. Non-Premium OTT includes the rest of Digital video, dominated by Google's Youtube and by Facebook video.

Findings:

1. Premium OTT has a far higher ROAS than the average of all video types:

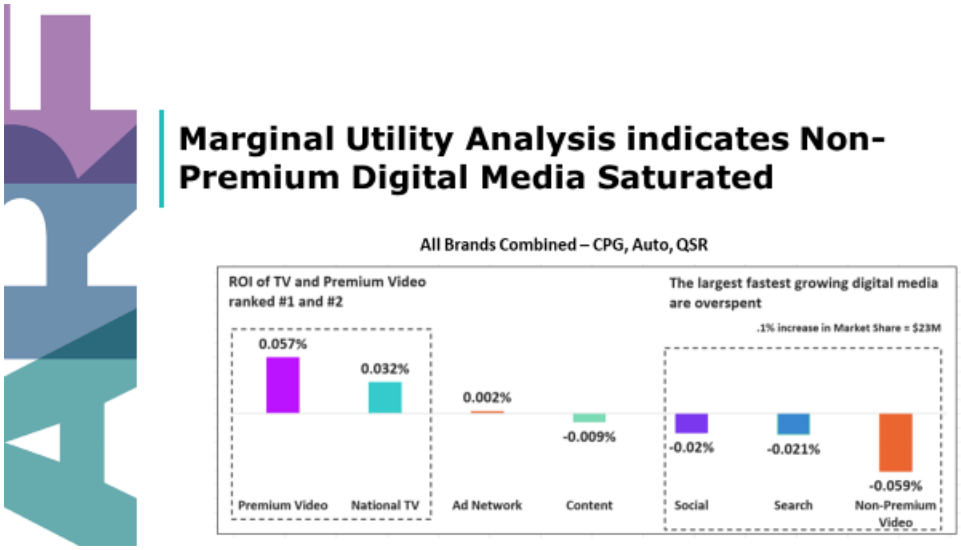


This is likely to be the result of a number of factors:

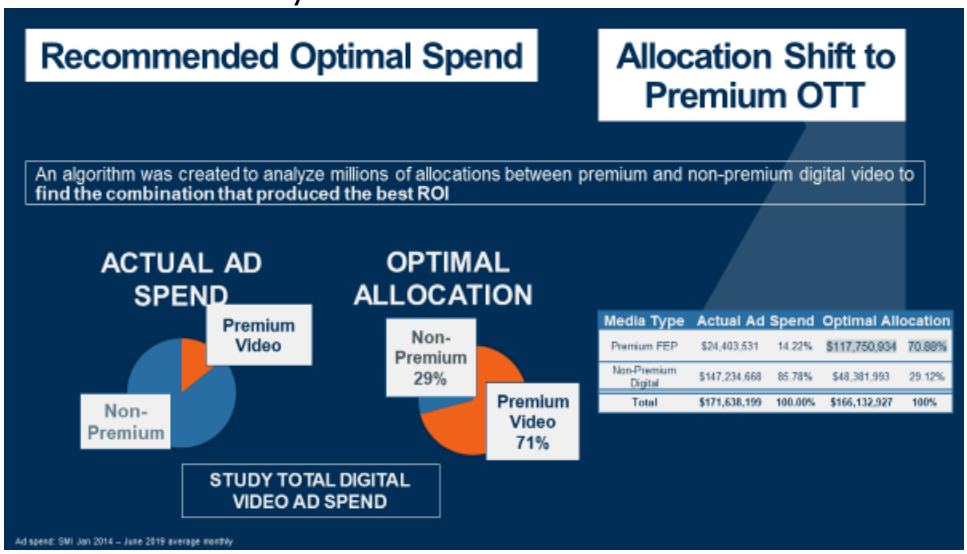
a. Addressability – the ability to pre-select people based on data indicating they consume the advertised product type
b. Context – the viewer sees commercials in the same way they appear on Television, an ingrained experience across the population, and not with a 5-second countdown until it is possible to click and skip the ad
c. Reduced ad load – fewer spots per hour as compared with Television
d. Time shifting – OTT is a video on demand (VOD) medium, meaning a viewer can await the perfect time from their own point of view to watch the show they want to watch, putting the viewer into a more immersive mood
e. Streaming is a hit trend in the population, especially among younger people, and the enjoyability of this method of viewing is both logically

and apparently conducive to greater receptivity and responsiveness to advertising.

2. Marginal utility analysis indicated as had been suspected that these largest advertisers had overspent in Non-Premium OTT and in other Digital media. Premium OTT and Television however were not yet saturated:



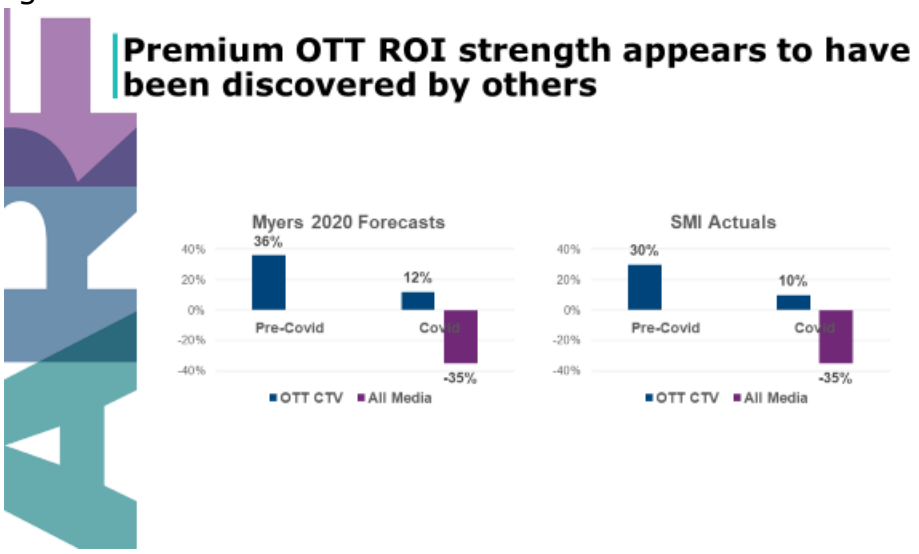
3. As a result, the theoretical reoptimizations recommended a Digital video flipflop from what were mostly Non-Premium OTT investments, to a mix that was mostly Premium OTT investments:



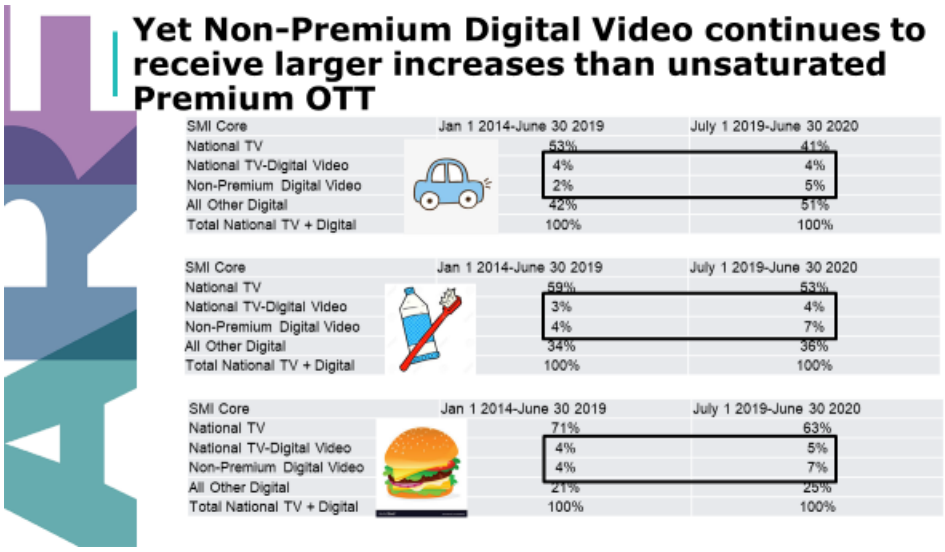
Media Type	Actual Ad Spend		Optimal Allocation	
Premium FEP	$24,403,531	14.22%	$117,750,934	70.88%
Non-Premium Digital	$147,234,668	85.78%	$48,381,993	29.12%
Total	$171,638,199	100.00%	$166,132,927	100%

4. It is interesting to note that according to the popular Jack Myers forecasts as well as the SMI actuals, at least some advertisers and agencies would appear to have had come to the same conclusions already, in that adspend in Premium OTT just before Covid had been

growing at +30% year over year, and during Covid when virtually all other media dropped precipitously, Premium OTT has continued to grow against the Covid contraction:



5. Nevertheless it would also appear that a preponderance of advertisers and agencies in these three verticals had not realized the marginal utility saturation of Non-Premium OTT, which in the 12 months ending June 30, 2020 continued to grow far faster than Premium OTT:



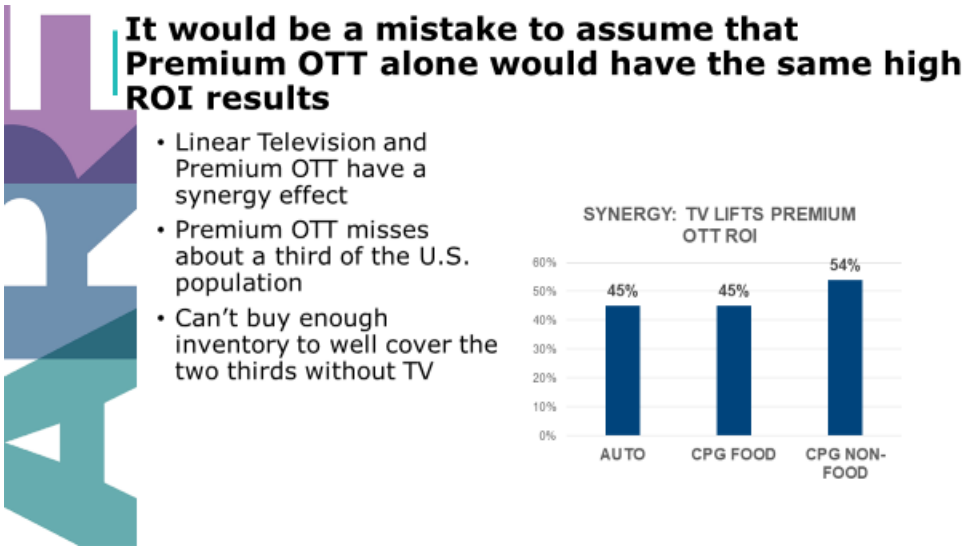
Yet Non-Premium Digital Video continues to receive larger increases than unsaturated Premium OTT

SMI Core	Jan 1 2014-June 30 2019	July 1 2019-June 30 2020
National TV	53%	41%
National TV-Digital Video	4%	4%
Non-Premium Digital Video	2%	5%
All Other Digital	42%	51%
Total National TV + Digital	100%	100%

SMI Core	Jan 1 2014-June 30 2019	July 1 2019-June 30 2020
National TV	59%	53%
National TV-Digital Video	3%	4%
Non-Premium Digital Video	4%	7%
All Other Digital	34%	36%
Total National TV + Digital	100%	100%

SMI Core	Jan 1 2014-June 30 2019	July 1 2019-June 30 2020
National TV	71%	63%
National TV-Digital Video	4%	5%
Non-Premium Digital Video	4%	7%
All Other Digital	21%	25%
Total National TV + Digital	100%	100%

6. Synergy analyses indicated large synergy effects between Television and Premium OTT, indicating that the two unsaturated media types both work best together with each other:



Conclusions & Recommendations:

1. The national time series analysis methodology across entire verticals seems to be needed as a complement to the other forms of ROAS analytics, in that the method in this study brought to light findings about saturation which the market in general appears to not have realized.
2. Advertisers and agencies need to avoid thinking in terms of CPM and to pay more attention to ROAS and especially the marginal utility measurement of saturation effects. It is likely that the low CPM of Non-Premium clouded the minds of some practitioners who have continued to pour hundreds of millions of dollars into media that have passed the point of returning incremental sales to those brands.

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