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AN EXPLORATORY STUDY FOR UNDERSTANDING THE DRIVERS OF DISPLAY ADVERTISING SPEND IN USA

Abstract:

This study attempts to explore the key aspects pertaining to the growth of display advertising and some of the associated media substitution effect in USA. It has been done based on literature review and analysis of leading national advertisers' data in USA between 1999 to 2011 period. It attempts to highlight the potential drivers of this adoption of display advertising in USA market by analyzing 65 advertisers who had minimum 6 years of available media data between 1999 - 2011 in USA market. These marketers were predominantly in the product categories of automotive; computers, software; financial services; food; medicines & remedies; personal care; retail and telecommunications (the product categories with at least 4 advertisers in the category in the study). The study has analyzed US advertising spend data of measured media (media data available by individual medium of TV, Magazines, Newspapers, Radio, Outdoor and display advertising based on data from Advertising Age) and aggregate unmeasured media.

The study demonstrates that each medium has seen statistically significant changes in many of the years between 1999 to 2011 period. It is seen from the study that proportion of TV spend has not decreased from 1999-2011. Many advertisers generally have been reluctant to shift a large proportion of their advertising budgets from traditional media (including TV) to the internet (display). Product category and the year have been found to be the most important variables in determining the proportion of display advertising. Revenue category has been also found to be significant; however, its predictive power has been lower.

Product category is one of the most important factors in deciding the proportion of display advertising spend of a firm. Three categories such as computers, software; financial services and telecommunications have been found to be the early adopters of digital media since it became a mainstream channel. These categories show the highest average proportion of internet spending across the chosen years.

Keywords:

Display Advertising; Advertising Media; Media Substitution Effect

JEL Classification: M31, M37, C10

Introduction

According to Mckinsey Global Media Report (2015), digital advertising is the fastest growing media category with 16.1 percent compounded annual growth rate (CAGR) from 2009-2014 globally. During this period, newspaper publishing had a CAGR of -1.5 percent. According to the same report, "Spending on media continues to shift from traditional to digital products and services at a rapid pace."

Display advertising has become one of the key advertising media today. According to emarketer (2016) article, in 2015 US spending for search advertising was \$26.53 Billion vs. \$26.15 Billion for display (including banners and other, video, rich media and sponsorships). Given the increase, display advertising spend is expected to supersede search advertising spend in US for the first time in 2016. Given its growth, exploring display advertising retrospectively can add great value to current understanding of it, allowing researchers to capitalize on this soon to be leading advertising medium. This study primarily attempts to explore a few of the key aspects pertaining to the growth of display internet advertising in USA. It has been done based on literature review and analysis of Advertising Age leading national advertisers' data in USA between years 1999 to 2011.

Research gap exists as analytical understanding of how the micro-level media substitutability decisions are made by individual advertisers is limited in international research literature. Exploring this aspect at advertiser level may shed some light on why aggregate advertising expenditure is trending the way, as mentioned in literature.

Literature Review

Role of Internet in Reshaping the Media Industry

Online advertising changed the mix of media choices in campaigns across Europe (Klue 2006). Klue (2006) indicated that the in depth interviews for his study revealed that a cascade effect was clearly under way as key opinion formers in each country's (in Europe) marketing community discovered the potential of the new tools, and embraced online media. It was projected that there would be greater demand for online advertising (Klue 2006).

Jobs and Gilfoil (2014) study indicated that companies should gain competitive advantage and improve their financial ROI through a partial reallocation of advertising investment from traditional media to social media. The study emphasized that this reallocation being facilitated by the increasing amount of money and time people were spending consuming media online (internet) as opposed to using traditional media. After a more in-depth look at how each medium contracted or grown since 1997, when the web emerged as a viable advertising platform, some researchers drew the conclusion that no significant growth happened in any medium but the internet (Lightcap and Peek 2012).

Zentner (2012) study examined how the internet was reshaping the media industry and the substitution in advertising expenditures across online and traditional media. It quantified the relationship between internet adoption and changes in advertising expenditures on traditional media types by using a panel of 11 years of data (up to 2008) at the various country levels that contained information on advertising expenditures by medium and internet penetration for more than 80 countries.

KEY PARAMETERS IN INTEGRATED FRAMEWORK

Product Category/Industry Sector

The relative investment reallocation percentage may vary from industry sector to sector based on factors such as sector dynamism and the strength of the relationship between the firms in a sector and their customers'/users' media usage patterns (Jobs and Gilfoil 2014). Hence, to contextualize, the advertising spend reallocation to online media may be dependent on the product category.

Role of Advertiser Size (Revenue Category)

Klue (2006) highlighted that as an innovation, online marketing was poorly distributed, and it was not unusual to see two firms within the same sector behave radically differently. Hence, the advertising spend reallocation to online media may be dependent as well on the specific behaviour/dynamics of a firm (within a product category). The percentage of reallocation may also vary depending on variables including firm size (Jobs and Gilfoil 2014), which may be one such differentiator

capturing the concept of type of firm within a product category. It is important to note that the online advertising adoption model suggested that brands with higher market share were more likely to adopt online advertising (study in the context of carbonated soft drink industry) (He, Lopez and Liu 2015).

Role of Advertiser Headquarter Continent

Rugman and Verbeke (2004) reported that of the 500 largest multinational enterprises (MNEs), many might actually be regional along the breadth and depth of their market coverage. Rugman et al. (2012) stated “the majority of large firms do not have global dimension in their international competitiveness in sales.” This highlights the need to study regional differences through the impact of advertiser headquarters primarily based in North America, Europe and Asia upon advertiser media allocation policies.

Research Objectives

Research objectives for this study, exclusively focused on US Market between the period of 1999-2011, are as below:

Research Objective 1: Understanding the change dynamics for the measured media and unmeasured media over a long period of time post the advent of internet advertising

Research Objective 2: Comprehending the effect of HQ continent, revenue category and product category (independent variables) on display advertising spend of an advertiser (dependent variable)

Research Objective 3: Exploring some of the dynamics of the media substitution effect

Methodology

For the present study, yearly advertising spend data for 100 leading national advertisers (LNA) in USA was obtained from Advertising Age for the period of 1999 to 2011 (Advertising Age 2012). Year 1999 was chosen as the initial year for this study because by 1998 the internet/on-line advertising revenue in US had reached nearly \$2 billion from \$267 million in 1996 (PRICEWATERHOUSECOOPERS 1999) and Google was formally incorporated as a company on September 04, 1998 (Fitzpatrick 2014). The last year of the study was kept as 2011 because Real Time Bidding had

entered the display advertising landscape in early 2010 (Kelly). This study provided a buffer of 1 year from 2010 to capture effects of this innovation.

The advertising spend is broadly divided into two parts here.

- a. Measured media- Measured-media advertising is estimated U.S. spending across 19 media. Measured media include:
 - i. TV
 - ii. Magazines
 - iii. Newspapers
 - iv. Radio
 - v. Outdoor
 - vi. Internet: expenditures reflect display advertising only.
2. Unmeasured media: Unmeasured media aggregate spending (no break-up available)
3. The study obtained corresponding available / estimated US sales data for the advertisers as described below:
 - a. Advertisers with minimum 6 years of available media data on six measured media and aggregate unmeasured media between years 1999 to 2011 were shortlisted for analysis. Accordingly, total 65 advertisers were shortlisted.
 - b. The final data was advertiser wise and year wise. For any advertiser, at most 13 rows were available (for 1999 to 2011). 'Internet' referred to display advertising exclusively in this study for data analysis purpose.
4. For this analysis, new variables were created using prefix 'PROP' that stands for proportions. Hence, PROP_Internet meant proportion (%) of total media spend into internet for an advertiser (Internet spend of an advertiser divided by its total advertising spend consisting of both measured media and unmeasured media spends) and so forth for each medium.

Data Analysis and Findings

From table 1, it is apparent that the inertia to change is there in some advertisers. In TABLE 1, proportion of TV spend did not decrease from 1999 to 2011. Many advertisers were reluctant to shift a large proportion of their advertising budgets to the internet because they still viewed television advertising as an important vehicle for building a brand (as summarized in Draganska, Hartmann and Stanglein 2014). Internet spend proportion was one of the lowest spend proportion among the media across the years though it was on an upward trajectory (table 1).

TABLE 1: Proportion of Advertising Spend Media wise (%) (6 Measured Media & Aggregate Unmeasured Media)

Year	# of advertisers	PROP-Internet	PROP-Magazine	PROP-Newspaper	PROP-Outdoor	PROP-Radio	PROP-TV	PROP-Unmeasured	Total (%)
1999	41	0.6	9.5	5.1	0.4	1	31.2	52.1	100
2000	49	0.6	9.3	5.8	0.4	1.4	34.9	47.6	100
2001	52	1.6	9.3	6.3	0.5	1.3	32.7	48.3	100
2002	54	1	10.4	6	0.4	1.3	35.7	45.2	100
2003	59	1.6	10.3	6.7	0.5	1.5	35.8	43.7	100
2004	61	2.3	9.6	6.6	0.5	3.2	36.4	41.4	100
2005	62	2.2	10.4	7.9	0.8	2.9	34.2	41.6	100
2006	61	2.9	10.7	6.8	0.8	2.9	33.7	42.2	100
2007	61	3.4	10.6	6.3	0.9	2.9	32.7	43.3	100
2008	61	2.6	9.8	5.8	0.7	2.6	33.3	45.2	100
2009	62	4.1	9.3	6.1	0.9	2.5	36.3	40.9	100
2010	57	4	9.9	5.2	0.9	2.4	38.5	39.1	100
2011	49	3.9	9.4	4.2	0.9	2.4	36.7	42.5	100

Data Source: Advertising Age

Statistical Significance Analysis of Proportion Data

The analysis done here required the usage of data of the advertisers that had data for all 13 years. Attempt was made to analyze whether yearly differences in proportions were statistically significant for PROP_Internet, PROP_Magazine, PROP_Newspaper, PROP_Outdoor, PROP_Radio, PROP_TV and Prop_Unmeasured. The study used one way repeated measures ANOVA on these advertisers.

Statistical Significance of Change in PROP_Internet over the years

The test using the null hypothesis of Repeated Measures ANOVA stated that PROP_Internet did not change statistically significantly in any of the years from 1999-2011.

One of the most popular tests to determine whether null hypothesis should be rejected in one way repeated measures ANOVA is Wilks' lambda test. A significance value of $p < 0.05$ (column Sig.) indicates that the null hypothesis could be rejected. In this study, Wilks' lambda = 0.223, F Value of 94.856 (exact statistic), Hypothesis df of 12.0, significance of 0.000 and observed power of 1.000 computed using alpha = .05). So, indeed Prop-Internet changed (at least once) statistically significantly over the years.

Next, a pair-wise evaluation was run to determine the years in which statistically significant differences were seen in PROP_Internet from year to year. The model was run with Bonferroni adjustment. This pair wise evaluation provided the detail about in which years there were statistically significant differences for Prop_Internet (this evaluation is in table 2).

TABLE 2: PROP_ Internet from year to year (The Bonferroni correction)

FullYear 2	FullYear 1	Year2	Year1	Mean Differenc e (I-J)	Std. Error	Sig. ^b	95% Confidenc e Interval for Difference ^b	
							Lower Bound	Upper Bound
2000	1999	2	1	.134*	.039	.044	.001	.267
2001	2000	3	2	1.146*	.115	.000	.750	1.541
2002	2001	4	3	-.730*	.091	.000	-1.044	-.416
2003	2002	5	4	.501*	.081	.000	.223	.779
2004	2003	6	5	1.051*	.124	.000	.622	1.479
2005	2004	7	6	.007	.070	1.000	-.235	.249
2006	2005	8	7	.382*	.092	.003	.064	.700
2007	2006	9	8	.860*	.112	.000	.476	1.245
2008	2007	10	9	-1.572*	.125	.000	-2.003	-1.141
2009	2008	11	10	2.606*	.201	.000	1.912	3.300
2010	2009	12	11	-.592*	.125	.000	-1.022	-.162
2011	2010	13	12	-.556*	.139	.006	-1.034	-.079

Based on estimated marginal means

*. The mean difference is significant at the .05 level (difference between Full Year2-Year 2000 and Full Year1-year 1999 significant and so on in subsequent rows)

b. Adjustment for multiple comparisons: Bonferroni.

It was noticed that with the exception of difference between 2005 and 2004, all other consecutive years displayed statistically significant differences for PROP_ Internet (table 2). The yearly trend (increase/decrease between any two consecutive years) for different media is highlighted in table 1.

It was noticed that for all metrics, based on related analysis, the null hypothesis was rejected i.e there was at least one pair of years for which each metric- PROP_Internet, PROP_Magazine, PROP_Newspaper, PROP_Outdoor, PROP_Radio, PROP_TV and PROP_Unmeasured Media differed statistically significantly between years 1999-2011. For magazines, difference was statistically significant in all years (except 2000-01, 2002-03, 2003-04, 2006-07, 2008-09, 2009-10 and 2010-11); for newspaper, difference was statistically significant in all years (except 2000-01, 2001-02, 2003-04, 2004-05 and 2008-09); for Outdoor, difference was statistically significant in all years (except 2001-02, 2002-03, 2005-06, 2007-08, 2008-09, and 2010-11); for Radio, difference was statistically significant in all years (except 2001-02, 2002-03, 2006-07, 2007-08, 2008-09, 2009-10 and 2010-11); For TV, the difference was statistically significant in all years (except 2000-01, 2005-06, 2006-07 and 2010-11) and for unmeasured media, difference was statistically significant in all years (except 2000-01, 2001-02, 2004-05, 2006-07 and 2009-10). Hence, it may be summarized that media landscape went through significant changes from 1999 to 2011. The present study focuses on a few of these changes especially changes about internet (display) spending proportions.

Effect of HQ Continent, Revenue Category and Product Category on Proportion of Display Advertising Spend

This study modelled Prop_Internet using variables such as HQ continent, company size (revenue category) in US and product categories. Conditional inference tree (CTREE) was used to further analyze the data (through images). Product category and year were found as the most important variables in determining proportion of internet spend of the advertisers.

It was seen that for three categories {Computers, software; Financial Services; Telecommunications} the average proportion of internet spend was 2.9% and 7.1% for years [1999-2003] and years [2004-2011] respectively. These categories showed the highest average proportion of internet (display) spend across the chosen years and were found to be the early adopters of digital media since it became a mainstream

channel. Other categories grew their proportion of display advertising spend in the later years of the study period and took time to adopt display advertising.

For the other product categories of the study {Apparel; Automotive; Beer, Wine & Liquor; Cleaners; Electronics; Food; General Services / Infrastructure & Finance; Medicine & Remedies; Personal care; Retail; Soft Drinks; Toys & Games} (with varying sample sizes), while analyzing the average proportion of display spend, the variable “year” played a more significant role. This was because the trend of spend changed over the years for a few categories while it remained consistent for others.

Substitution of Media

Much of the substitution effect here was studied with eight categories of {Computers, software; Financial Services; Telecommunications; Automotive; Food; Medicine & Remedies; Personal care; Retail} which had at least four advertisers in the sample. The analysis was carried out over the consolidated 13 year period.

Proportion of Internet Spend and Proportion of Unmeasured Media Spend

It was noted that for product categories of Telecom; Computers, software; Food; Medicines & Remedies; Personal Care and Retail, high negative and statistically significant correlations were there between proportion of internet spend and proportion of unmeasured media spend indicating high level of substitution between them.

Proportion of Unmeasured Media and Different Measured Media Spend

Proportion of unmeasured media spend and spend in different measured media were explored for advertisers. Negative correlation of media spends between TV and unmeasured media was pronounced and statistically significant for all chosen 8 categories (correlation range between -0.44 to -0.93). This correlation indicated that whenever proportion of spend on TV reduced, an increase in proportion in unmeasured media spend was likely. This statistically significant negative correlation with unmeasured media was there also for computer, software category (for outdoor); for financial services, food and personal care (for radio); financial services, medicines, personal care, retail and telecommunications (for magazines) and automotive, computer, software, medicines, personal care and retail (for newspapers).

Conclusions

This study attempted to explore the changes in the media landscape, to understand key drivers of the growth of display advertising and to study the select aspects of the related media substitution effect in USA through the development of an integrated framework. The analysis was done at individual advertiser level for 65 leading advertisers based on evaluation of Advertising Age leading national advertisers' data in USA between the years 1999 to 2011. The analysis involved use of US measured media spend data available for individual medium of TV, Magazines, Newspapers, Radio, Outdoor and internet (display) advertising and aggregate unmeasured media spend.

This study demonstrated that proportion of spend of each analyzed medium had seen statistically significant changes during much of the period between years 1999 to 2011. It was seen that on an overall basis the proportion of TV spend did not decrease from 1999 to 2011. Large numbers of advertisers generally were reluctant to shift a large proportion of their advertising budgets from measured media (including TV) to internet (display). Internet spend proportion was one of the lowest spend proportion among the media across the years though it was on an upward trajectory. There had been at least one pair of years for which each metric of proportion of spend on PROP_Internet, PROP_Magazine, PROP_Newspaper, PROP_Outdoor, PROP_Radio, PROP_TV and PROP_Unmeasured media differed statistically significantly between years 1999 to 2011.

In the developed integrated framework, the effects of variables like product category of advertiser, advertiser size (revenue category) and advertiser headquarter continent were analyzed to understand the growth of proportion of display advertising spend. Product category, revenue category and the interaction between product category and revenue category had statistically significant influence in explaining proportion of display spend. Product category and the year were the most important variables in this process.

Early adopter categories of {computer, software; financial services and telecommunication}, had the highest average proportion of display spend across the

years and had predominance in this spend in early part of the study period. Other categories were slower in adopting display advertising and grew their proportion of display advertising spend at a faster rate than early adopter categories in the later years of the study period.

For the eight product categories which were analyzed in detail (with at least 4 advertisers in the category), the effect of possible shift of media spend from TV to unmeasured media was pronounced and statistically significant for the analyzed categories. Whenever proportion of spend on TV reduced, an increase in proportion in unmeasured media spend was likely. Among analyzed categories, except for financial services and automotive, significant negative correlation was seen between proportion of spend on unmeasured media and display spend, suggesting that the overall pie of new-media was possibly not increasing for these players, rather carving out of budget from one new-media to another was happening.

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