Economic Value of Joint Product Advertising With Online Product Video – Part 2

By

ANUJ KUMAR

Warrington College of Business

University of Florida

MEASURING THE ECONOMIC VALUE OF PRODUCT VIDEO

Jill learned in the course that measuring the value of marketing interventions could be challenging on a website. To illustrate her point, Jill asked the team members –How would they introduce product videos on the website to maximize its impact? The team members brainstormed and came up with the following possibilities

1. They will prioritize the introduction of product videos, e.g., first introduce it for popular (best selling) products, new arrivals, products with price discounts, or products with other marketing promotions.
2. They would pick an opportune time to introduce product videos for a product. For example, introduce product videos in the holiday season when consumers are favorably disposed towards shopping.
3. They would pick an opportune time to introduce product video for a product based on some product-specific events. For example, if a celebrity (say Angelina Jolie) wore a dress on the Oscar awards night, they would introduce the video for that product on the next day.

Question 1 (2 points)

-   *Write the expression for the value of product video in each of the three cases above.*

-   *Do the expressions above provide a correct estimate of the value of product video? If not, Why not?*

Experimental Design

The team decided to design a randomized experiment on its website to measure the true (causal) value of product video. The details of the experiments are as below:

The firm's website hosted a total of 571 products. Out of the total products, 317 were principal products (tops, bottoms, and dresses), and the remaining were shoes and accessories. The team decided to randomly choose 66 principal products (42 tops, eight bottoms, and 16 dresses) and create short 15-20 second videos for them. The product videos could be played by clicking on the video icons on the product pages (see Exhibit 4). In these videos, a human model displays a 360-degree view of the focal product

with its matching coordinating products. As is evident from Exhibit 4, the still picture of the focal products already shows the coordinating products on the focal product's page. With the introduction of a video, the customers could additionally view a dynamic, 360-degree presentation of the focal product with its coordinating products. The product videos were shot with a limited number of similar models and similar background settings so that any heterogeneity in product videos was mainly due to differences in product characteristics.

The team decided to randomize the timings of the introduction of product videos. It introduced product videos in three phases: 25 videos on February 17, 201X, 30 videos on March 23, 201X, and 11 videos on May 18, 201X. After hosting them on the website for over two months, the team removed these videos in three phases: on May 4, 201X, June 6, 201X, and July 18, 201X. The experiment was run during the 28 weeks of spring collection sales on the firm's website from January 13, 201X to July 26, 201X. Exhibit 5 shows the experimental design.

Exhibit 5: Experimental Design

The retailer sells different product assortments on the website and in retail stores, and there were no product reviews available on the retailer's website. Therefore, the possibility of these factors confounding the results of the experiment was absent.

Data Collection

The team collected weekly sales in numbers for all products during the experiment period. Besides product videos, other promotions introduced on the website could also influence product sales. Therefore, the team collected information on the following price and non-price promotions run by the firm during the study period.

Non-price promotions

> **Catalog promotion**: The firm periodically mails product catalogs to its customers. The firm mailed six different catalogs for the spring collection during the study period: 1.5 million copies on January 25, 2.2 million copies on February 15, 2.7 million copies on March 7, 3 million copies on April 2, 2.7 million copies on May 3 and 1.8 million copies on June 6, 200X. Although a catalog contains pictures of many products from the spring collection, those featured on the front and back covers of the catalog mainly catch customer attention. Thus, they may have higher sales than the product displayed inside the catalog. From experience, the team knew that it takes approximately seven to 10 days for the mailed catalogs to reach their intended recipients, and the catalogs affect product sales for about two weeks after that. During the study period, a total of 31 spring collection products appeared as featured products in the catalogs. The team

identified 62 product-weeks during which catalog drops could influence the sales of these 31 products.

Email promotion: The firm sends mass email promotions to its customers. The team collected details of the featured product and the timing of all promotional emails sent during the experiment period. Usually, the email promotions influence the sales of featured products during the week in which they are sent.

Home page and category front page promotion: The firm also promotes its products by placing them as featured products on the home page and the front pages of their product categories. During the time a product is featured on the home page or as a large picture on a category front page, it has a higher likelihood of being noticed and thus possibly have higher sales. Accordingly, the team collected details of all products featuring on the home page and category front pages during the experiment. During the period of study, 58 products appeared on the home page for 112 product-weeks, and 72 products featured on the front page of the product categories for 124 product- weeks.

Price promotions

Across-the-board price promotions: The firm offered several across-the-board promotions, such as free shipping for all orders over $75 on Mother's Day (May 13) or tax-filing days (April 16 – 18) and a summer sale of $10 off on orders of $75 and above in June. Such promotions apply equally to all products in a specific period, and it should affect the sales of all products alike.

Product-specific price promotions: The firm offered product-specific price markdowns to boost the sales of specific products. Since price markdowns could influence product sales, the team collected data on all price markdowns and their duration during the experiment period. In all, 300 products (70 tops, 14 bottoms, 18 dresses, eight pairs of shoes, and 190 accessories) received a price markdown for 1,072 product-weeks. Of these 300 products, prices for 279 were marked down during July 201X, i.e., the last four weeks of spring collection sales.

Economic Value of Product Video

The joint display of focal and its matching coordinating products in the focal product video could increase the sales of both products. Therefore, the economic value of product video is the total increase in sales of the focal and its coordinating products attributable to their joint display in the video. Accordingly, two datasets were created for this analysis

1. Focal product analysis data to check the validity of randomization and to estimate the effect of a product video on focal product sales.
2. Coordinating product analysis data to estimate the effect of a product video on coordinating product sales

Focal Product Sales Analysis

The effect of videos on focal product sales is the difference in weekly sales of focal products that have videos (treated products) and those that do not have videos (control products). Some of the focal products also appear as coordinating products in the videos of other focal products. Appearance as coordinating

products in other products' videos could additionally influence the sales of such focal products. Therefore, the team decided to drop such products from the focal product analysis. Exhibit 6 shows the selection of treatment and control products for focal product analysis. The team decided to use the final sample of 58 treated focal products and 239 control focal products in this analysis.
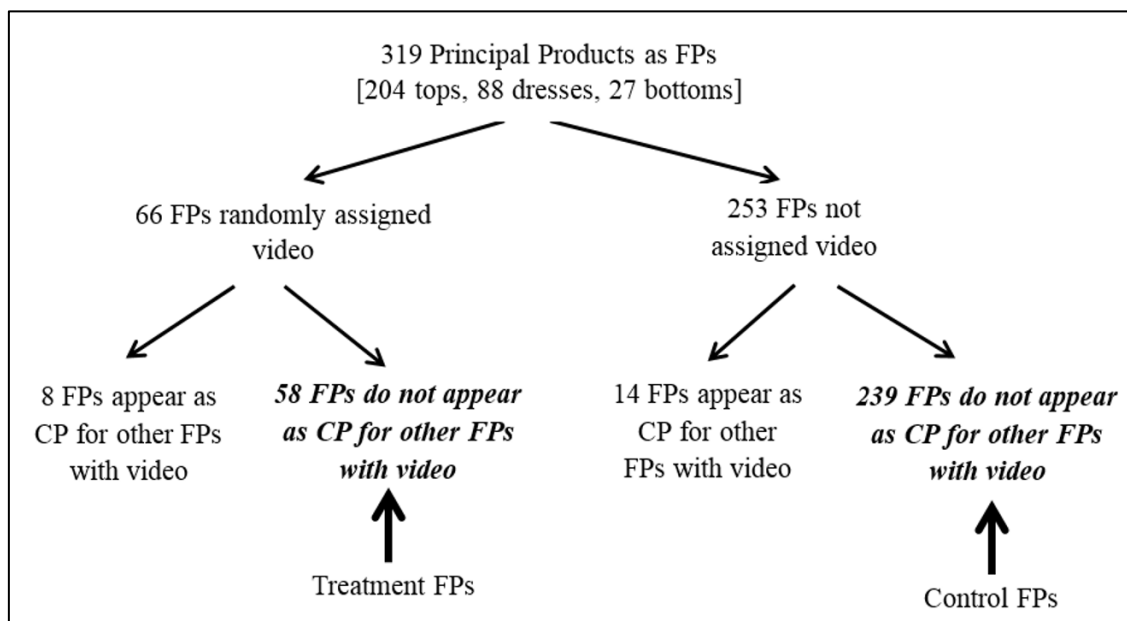

Exhibit 6: Selection of treatment and control products in focal product analysis

Randomization Check

The team collected the following product-related data: (1) price in USD (called *ProdPrice*); (2) video treatment status (*Vid*=1 indicates video created for the product and otherwise *Vid*=0); and (3) products category (called *ProdCat*). **The MS Excel worksheet titled "Random Check" inside the MS Excel file titled "Data" provides this data.**

If the videos were randomly assigned to products, the characteristics of the treated and control products should be statistically similar. Moreover, the proportion of treated products in the whole sample should proportionately transmit to the proportions of treated products in each product category (tops, dresses, bottoms).

Question 2 (2 points)

Explain how the randomization check introduced above be conducted? Then conduct the randomization checks based on your understanding and explain whether the integrity of randomization holds in the present experiment. Report all details of the tests you conduct. You should use the data in the sheet named "Randomization check" in the excel file named "Data" to answer this question.

Treatment Effect of Videos on Focal Product Sales

The MS Excel worksheet titled "Data Dictionary" inside the file titled "Data" describes each variable needed for estimating the treatment effect of video on the focal product sales. The MS Excel worksheet

titled "FP Analysis data," provides the data. It contains 6828 weekly sales data for 297 products (1392 weeks for 58 video-treated products and 5436 weeks for 239 control products). The weeks before, during, and after the video hosting for treated products are indicated by indicator variables *PreVidWk* (value=1 for 411 product-weeks), *VidWk* (value=1 for 640 product-weeks), and *PostVidWk* (value=1 for 341 product-weeks), respectively. For control products, the value of these variables is zero.

There are two methods of estimating the treatment effect of videos on focal product sales

1. **Difference-in-Means estimate**: Estimate the effect of video on focal product sales by computing the difference in mean weekly sales of products with videos from that for products without videos.

2. **Regression-based estimate**: Estimate the effect of video on focal product sales by running a linear regression model with the weekly focal product sales as a dependent variable and video treatment and other promotions as the independent variables.

Question 3 (2 points)

Compute the diff-in-means and regression-based estimates of the treatment effect of product videos on the focal product sales. Report these estimates and explain their interpretation. Then explain any reasons for why you think that these two estimates differ?

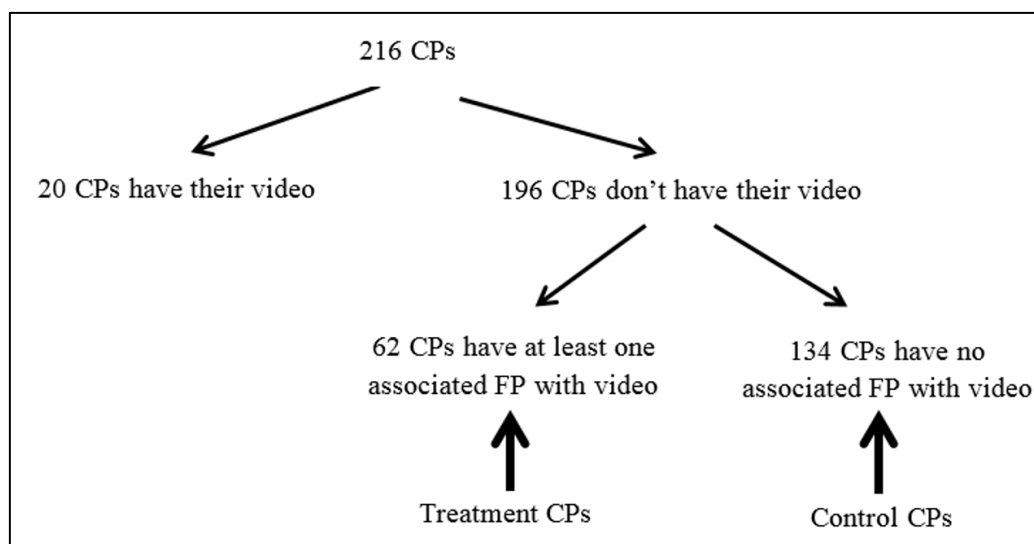**Coordinating Product Sales Analysis**

Exhibit 7: Selection of treatment and control products in the coordinating product analysis

The team next considered the effect of introducing a focal product's video on the sales of its associated coordinating products. To estimate this effect, they compared the sales of coordinating products for which the associated focal products have a video (treated products) with the sales of those for which the associated focal products did not have a video (control products). The sales of a coordinating product that also has a video on its page may be influenced by its video (For example, a pant may appear as a coordinating product for a top (focal product), but it may also have a video on its product's page). To isolate the effect of focal products' videos on coordinating product sales, the team dropped 20 such products from a total of 216 coordinating products in the coordinating product analysis. Exhibit 7 shows the selection of treated and control products for coordinating product analysis.

A coordinating product may be associated with more than one focal product. For instance, a pair of sunglasses can appear as a coordinating product for a top and a bottom with video and earrings without video. The team decided to create an indicator variable – called *Vidwk* - equal to one for all weeks when a coordinating product has one or more focal product videos switched-on and zero otherwise.

Treatment Effect of Videos on Coordinating Product Sales

The MS Excel worksheet titled "Data Dictionary" inside the file titled "Data" describes each variable needed for estimating the treatment effect of video on the focal product sales. The MS Excel worksheet titled "CP Analysis data" provides the data. It contains 4708 weekly sales data for 196 coordinating products (787 weeks for 62 treated and 3921 weeks for 134 control coordinating products). The weeks before, during, and after the video hosting of focal products of treated coordinating products are indicated by indicator variables *PreVidWk* (value=1 for 403 product-weeks), *VidWk* (value=1 for 787 product-weeks), and *PostVidWk* (value=1 for 338 product-weeks), respectively. The value of these variables for control coordinating products is always zero.

Question 4 (2 points)

Students should compute the treatment effect estimate for coordinating products using a regression based appraoch. Report the value of the estimate and its interpretation. After that compare the effect of videos on the focal and coordinating product sales.

Marketing-Mix Decision: Estimating the incremental effect of combining product video with other marketing promotions

Jill wondered if the effect of product video could be enhanced by combining it with other types of marketing promotions. She asked her team to estimate the effect of product video when it is offered with other promotions in the current experimental settings.

Question 5 (2 points)

Does product video have any incremental effect on sales when it is combined with other kinds of marketing promotions. Please conduct your analysis and report the incremental effect of offering product video with other marketing promotions.

Note: Please include all regression specifications you used in your answers