A cosmetics firm has tasked you to determine the effectiveness of its advertising activities on sales of a product it launched about 4 years ago. To do so, the firm provides you with data on advertising spends across multiple media. It also includes the months of spends and the sales generated in each month. The variable list is shown in Table 1. The deliverable for this task will be a report detailing the effectiveness of their ad spends, and a preliminary allocation model that the firm could use to guide their decision making.

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| --- | --- |
| Variable | Description |
| Months | Time in Months |
| Sales (units) | Sales of items in units in the month |
| ADV\_Total | Total Advertising Spend in the month, comprises ADV\_Offline and ADV\_Online |
| ADV\_Offline | Total Offline Advertising Spend, comprises Catalogs\_ExistCust, Catalogs\_Winback, Catalogs\_NewCust in the month |
| Catalogs\_ExistCust | Amount spent on Shopping Catalogs sent to existing Customers in the month |
| Catalogs\_Winback | Amount spent on Shopping Catalogs sent to Customers (who have not bought for at least 6 months) in the month |
| Catalogs\_NewCust | Amount spent on Shopping Catalogs sent to New Customers in the month |
| Mailings | Amount spent on Mailings (excluding Catalogs) sent to Customers. Mailing include flyers, postcards and letters in the month |
| ADV\_online | Total Online Advertising Spend, comprises Banner, Search, SocialMedia, Newsletter, Retargeting and Portals in the month |
| Banner | Amount spent on Banner ads in the month |
| Search | Amount spent on Search ads in the month |
| SocialMedia | Amount spent on Social Media ads in the month |
| Newsletter | Amount spent on Newsletter ads in the month |
| Retargeting | Amount spent on Retargeting ads in the month (<https://retargeter.com/what-is-retargeting-and-how-does-it-work/>) |
| Portals | Amount spent on ad portal advertising in the month (<https://www.marketingterms.com/dictionary/portal/>) |

**Table 1: Description of variables in the dataset**