Homework 2 Solution

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Question 1: This is a causal analysis. This is because the firm is interested in knowing which keyword results in the highest clicks per dollar. To do this, they need to know the effect that changing the keywords on clicks per dollar.

To elaborate,

Criteria

- Correctly identifying this is a causal analysis. What makes this causal is the phrase 'should use', which indicates that the firm is going to change the key word while.

- Reasonable submissions for stating that this is descriptive or predictive receive half marks.

Question 2:

The Cosmetics category is associated with the largest clicks per dollar. This is because it is the baseline, and all other categories have negative coefficients.

Criteria

- Correctly identifying the Cosmetics category as having the highest clicks per dollar.

Question 3

The ageMean coefficient means that when the targeted age increase by one, the expected number of clicks per dollar increases by 2.60.

Criteria

- Using the correct coefficient from the analysis.

- Correctly interpreting the coefficient.

Question 4

When the targeted age increases by 1, the eCom category receives 0.36 fewer clicks per dollar than the Cosmetics category. Older customers prefer cosmetics to eCom.

Criteria

- Correctly stating that older customers prefer eCom less.

- Correctly including the baseline category in your interpretation.

Question 5 $0.41373 + 2.41940 = 2.833$. You can get this result following the slides on marginal effects in the slides.

Criteria

- Correctly calculating the marginal effect.

Question 6

The coefficient on eCom decreased from -32.54 to -48.70. This happened because the coefficient now represents something different. Previously, it was the effect for all users, but now it is the effect for those with an age of 0.

Criteria

- Correctly noting the difference in the coefficients.
- Correctly explaining why the coefficient changed.

Question 7

For a 20 year old, the top three categories are Cosmetics, Retailer, and eCom. For a 60 year old, the top three categories are Cosmetics, Retailer, and Department.

Criteria

- Correctly identifying the top categories for the two age groups.
- Correctly incorporating the baseline category in your calculation.

Below is an R-Calculation, but doing this by hand was also acceptable:

```
catCoef = c(0,-48.70,-28.29,-60.24,-48.38,-41.47)
interactCoef = c(0,0.42,-0.36,0.36,0.16,0.33)

names(catCoef) = c("Cosmetics","Department","eCom","General","High End", "Retailer")

catCoef+20*(2.42 + interactCoef)
```

```
##  Cosmetics Department       eCom    General   High End   Retailer
##      48.40       8.10      12.91      -4.64       3.22      13.53
```

```
catCoef+60*(2.42 + interactCoef)
```

```
##  Cosmetics Department       eCom    General   High End   Retailer
##     145.20     121.70      95.31     106.56     106.42     123.53
```