

JUNO & Co.

FB Ads Analysis

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Agenda

1. Introduction: Company, Data Set, Project Objectives
2. Web Analytics
3. Regression Analysis
4. Limitations, Recommendations & Next Steps

Company Introduction

1. Location: Burlingame, CA
2. Mission: to create innovative & quality beauty products at affordable prices
3. Sales channels: thejuno.co, Amazon, beauty retailers
4. Main Advertisement: FB/Instagram ads



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Data Set

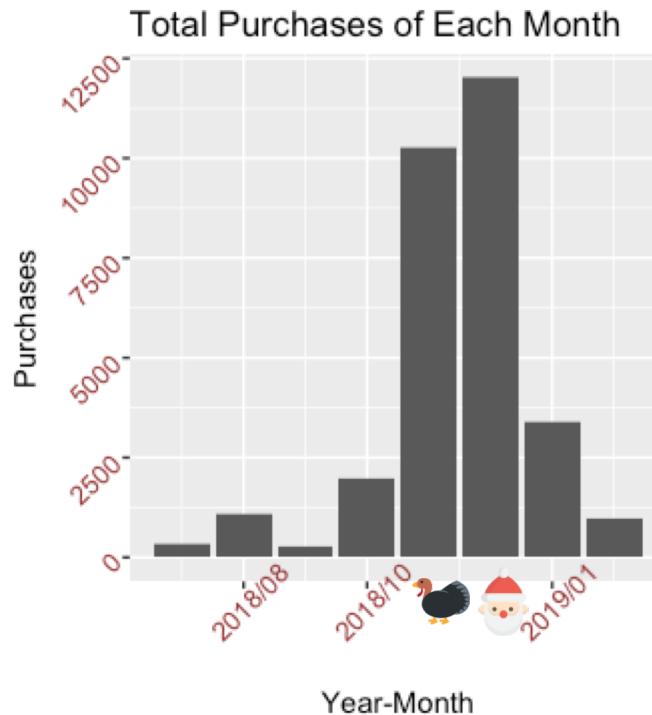
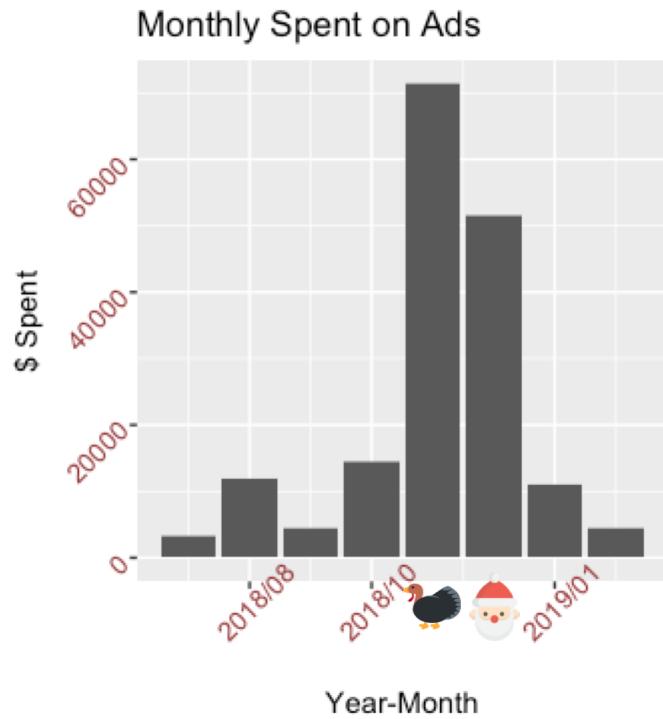


1. Data source: JUNO's FB Ads Manager
2. Data size: 46 x 5448
3. Time period: marketing campaigns from July 1, 2018 - February 28, 2019
4. Key of the Data: campaign_ID, Region, yearfe, monthfe
 - a. Each row - metrics of a marketing campaign for a region during a specific month
5. Important variables:
 - a. Campaign Name & Campaign ID
 - b. monthfe & yearfe (created, mainly for FE models purpose), Region
 - c. amount_spent_USD, Purchases, Reach, Impressions, Frequency, link_clicks, CTR_link, unique_purchases

Project Objectives

1. Evaluate the metrics and effectiveness of each marketing campaign from July 2018 - February 2019
2. Segment the regions/states to find out the states to focus on, and the states to avoid
3. Evaluate the impact of FB ads expense on number of purchases

Web Analytics I - Monthly \$ Spent on Ad & Monthly Purchases



Web Analytics II - Current States Metrics

Top 10 States with the HIGHEST Ad Spend & Total Purchases

	Region	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	California	32761.4597	6581	75552	0.08710557	4.978189	0.4336280
2:	Texas	18709.3029	3567	57360	0.06218619	5.245109	0.3261733
3:	Florida	10071.2076	1904	25804	0.07378701	5.289500	0.3902964
4:	New York	9855.9894	1719	23274	0.07385924	5.733560	0.4234764
5:	Illinois	6588.7817	1252	21039	0.05950853	5.262605	0.3131699
6:	Arizona	4923.9010	1007	14676	0.06861543	4.889673	0.3355070
7:	Georgia	4656.7453	836	13339	0.06267336	5.570270	0.3491075
8:	Pennsylvania	4992.2215	831	14348	0.05791748	6.007487	0.3479385
9:	Washington	3949.1572	722	10871	0.06641523	5.469747	0.3632745
10:	Ohio	4304.7782	700	13680	0.05116959	6.149683	0.3146768

Bottom 10 States with the HIGHEST Ad Spend & Total Purchases

	Region	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
40:	West Virginia	693.3937	118	2740	0.04306569	5.876218	0.2530634
41:	District of Columbia	518.2236	88	967	0.09100310	5.888905	0.5359086
42:	North Dakota	313.2602	71	1063	0.06679210	4.412116	0.2946945
43:	New Hampshire	432.0561	67	1295	0.05173745	6.448598	0.3336341
44:	Rhode Island	520.0731	65	1301	0.04996157	8.001124	0.3997487
45:	Alaska	335.5671	58	1178	0.04923599	5.785640	0.2848617
46:	Maine	383.1251	57	1387	0.04109589	6.721492	0.2762257
47:	Delaware	355.3340	56	948	0.05907173	6.345249	0.3748249
48:	Montana	325.8006	38	1292	0.02941176	8.573699	0.2521676
49:	South Dakota	274.5328	36	1097	0.03281677	7.625912	0.2502578
50:	Wyoming	217.6741	22	835	0.02634731	9.894278	0.2606876

Region totaladspend totalpurchases totalclicks conrate costperpurchase costperclick

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Web Analytics II - States to target

> usstatesmetrics[order(costperpurchase)] Top 10 States with the LOWEST Ad Cost Per Purchase

	Region	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	North Dakota	313.2602	71	1063	0.06679210	4.412116	0.2946945
2:	Arizona	4923.9010	1007	14676	0.06861543	4.889673	0.3355070
3:	California	32761.4597	6581	75552	0.08710557	4.978189	0.4336280
4:	Nevada	2107.1727	421	5911	0.07122314	5.005161	0.3564833
5:	New Mexico	1209.2621	236	4432	0.05324910	5.123992	0.2728479
6:	Texas	18709.3029	3567	57360	0.06218619	5.245109	0.3261733
7:	Illinois	6588.7817	1252	21039	0.05950853	5.262605	0.3131699
8:	Florida	10071.2076	1904	25804	0.07378701	5.289500	0.3902964
9:	Colorado	2895.4499	547	9368	0.05839026	5.293327	0.3090788
10:	Utah	1961.3079	369	5019	0.07352062	5.315197	0.3907766

> usstatesmetrics[order(-conrate)] Top 10 States with the HIGHEST Ad Conversion Rate

	Region	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	District of Columbia	518.2236	88	967	0.09100310	5.888905	0.5359086
2:	California	32761.4597	6581	75552	0.08710557	4.978189	0.4336280
3:	Hawaii	799.4505	150	1730	0.08670520	5.329670	0.4621101
4:	Massachusetts	2802.0012	512	6838	0.07487569	5.472658	0.4097691
5:	New York	9855.9894	1719	23274	0.07385924	5.733560	0.4234764
6:	Florida	10071.2076	1904	25804	0.07378701	5.289500	0.3902964
7:	Utah	1961.3079	369	5019	0.07352062	5.315197	0.3907766
8:	New Jersey	4066.4032	685	9376	0.07305887	5.936355	0.4337034
9:	Nevada	2107.1727	421	5911	0.07122314	5.005161	0.3564833
10:	Maryland	2318.7180	404	5701	0.07086476	5.739401	0.4067213

Web Analytics II - States to avoid

Top 10 States with the HIGHEST Ad Cost Per Purchase

	Region	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	Wyoming	217.6741	22	835	0.02634731	9.894278	0.2606876
2:	Montana	325.8006	38	1292	0.02941176	8.573699	0.2521676
3:	Rhode Island	520.0731	65	1301	0.04996157	8.001124	0.3997487
4:	South Dakota	274.5328	36	1097	0.03281677	7.625912	0.2502578
5:	Connecticut	1420.3850	191	3397	0.05622608	7.436570	0.4181292
6:	Maine	383.1251	57	1387	0.04109589	6.721492	0.2762257
7:	Minnesota	2032.8008	307	6192	0.04958010	6.621501	0.3282947
8:	Nebraska	831.0592	126	2838	0.04439746	6.595708	0.2928327
9:	Wisconsin	2005.3847	306	6774	0.04517272	6.553545	0.2960414
10:	Idaho	861.6342	132	2841	0.04646251	6.527532	0.3032855

Top 10 States with the LOWEST Ad Conversion Rate

	Region	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	Wyoming	217.6741	22	835	0.02634731	9.894278	0.2606876
2:	Montana	325.8006	38	1292	0.02941176	8.573699	0.2521676
3:	South Dakota	274.5328	36	1097	0.03281677	7.625912	0.2502578
4:	Mississippi	973.2708	151	3816	0.03957023	6.445502	0.2550500
5:	Maine	383.1251	57	1387	0.04109589	6.721492	0.2762257
6:	West Virginia	693.3937	118	2740	0.04306569	5.876218	0.2530634
7:	Nebraska	831.0592	126	2838	0.04439746	6.595708	0.2928327
8:	Missouri	2326.8601	361	8114	0.04449100	6.445596	0.2867710
9:	Kansas	1302.5501	211	4733	0.04458060	6.173223	0.2752060
10:	Iowa	1119.9052	189	4217	0.04481859	5.925424	0.2655692

Web Analytics III - Campaigns Metrics

Top 10 Campaigns with the HIGHEST Ad Spend

	campaign_name	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	IG sponge remarketing - conversion	84034.25	13304	224453	0.059272988	6.316465	0.37439575
2:	\$1 landing page - conversions	46926.63	12195	97485	0.125096169	3.848022	0.48137283
3:	velvet video_VIEWS	15567.72	1155	150717	0.007663369	13.478545	0.10329107
4:	january purchase campaign	5877.01	1389	12153	0.114292767	4.231109	0.48358512
5:	October Clicks	3570.47	635	27754	0.022879585	5.622787	0.12864704
6:	Testing_May_clicks	3156.46	321	21685	0.014802859	9.833209	0.14555960
7:	Catalog sales	2137.22	328	1438	0.228094576	6.515915	1.48624478
8:	Dec video IG views	1990.70	124	9101	0.013624876	16.054032	0.21873421
9:	Press Coverage	1448.28	139	6540	0.021253823	10.419281	0.22144954
10:	full face challenge - traffic	1198.75	26	2699	0.009633197	46.105769	0.44414598
11:	iphone giveaway	1059.39	41	1202	0.034109817	25.838780	0.88135607
12:	October Mirror Purchase	973.48	31	2500	0.012400000	31.402581	0.38939200
13:	velvet video_clicks	966.26	199	8565	0.023234092	4.855578	0.11281494
14:	CLICKS \$1	643.09	60	2250	0.026666667	10.718167	0.28581778
15:	shopping cart	326.96	110	621	0.177133655	2.972364	0.52650564
16:	full face challenge - content read	315.09	34	495	0.068686869	9.267353	0.63654545
17:	nikkie velvet_links	282.38	0	73	0.000000000	Inf	3.86821918
18:	nikkie velvet_reach	279.67	0	26	0.000000000	Inf	10.75653846
19:	Mirror video _ sales	200.00	12	249	0.048192771	16.666667	0.80321285
20:	JUNO BOX Signup	195.54	20	720	0.027777778	9.777000	0.27158333
21:	velvet video_post engagement	185.62	16	2890	0.005536332	11.601250	0.06422837
22:	velvet clicks october	102.21	26	685	0.037956204	3.931154	0.14921168
23:	November views	89.69	0	435	0.000000000	Inf	0.20618391
24:	\$5 OFF code purchases - homepage	54.97	10	60	0.166666667	5.497000	0.91616667
25:	FB video post engagement	10.60	0	68	0.000000000	Inf	0.15588235

Web Analytics III - Most Successful Campaigns

> campaignmetrics[order(costperpurchase)]

	campaign_name	totaladspend
1:	shopping cart	326.96
2:	\$1 landing page - conversions	46926.63
3:	velvet clicks october	102.21
4:	january purchase campaign	5877.01
5:	velvet video_clicks	966.26
6:	\$5 OFF code purchases - homepage	54.97
7:	October Clicks	3570.47
8:	IG sponge remarketing - conversion	84034.25
9:	Catalog sales	2137.22
10:	full face challenge - content read	315.09

Top 10 States with the LOWEST Ad Cost Per Purchase

	campaign_name	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	shopping cart	326.96	110	621	0.177133655	2.972364	0.52650564
2:	\$1 landing page - conversions	46926.63	12195	97485	0.125096169	3.848022	0.48137283
3:	velvet clicks october	102.21	26	685	0.037956204	3.931154	0.14921168
4:	january purchase campaign	5877.01	1389	12153	0.114292767	4.231109	0.48358512
5:	velvet video_clicks	966.26	199	8565	0.023234092	4.855578	0.11281494
6:	\$5 OFF code purchases - homepage	54.97	10	60	0.166666667	5.497000	0.91616667
7:	October Clicks	3570.47	635	27754	0.022879585	5.622787	0.12864704
8:	IG sponge remarketing - conversion	84034.25	13304	224453	0.059272988	6.316465	0.37439575
9:	Catalog sales	2137.22	328	1438	0.228094576	6.515915	1.48624478
10:	full face challenge - content read	315.09	34	495	0.068686869	9.267353	0.63654545

> campaignmetrics[order(-conrate)]

	campaign_name	totaladspend
1:	Catalog sales	2137.22
2:	shopping cart	326.96
3:	\$5 OFF code purchases - homepage	54.97
4:	\$1 landing page - conversions	46926.63
5:	january purchase campaign	5877.01
6:	full face challenge - content read	315.09
7:	IG sponge remarketing - conversion	84034.25
8:	Mirror video _ sales	200.00
9:	velvet clicks october	102.21
10:	iphone giveaway	1059.39

Top 10 Campaigns with the HIGHEST Ad Conversion Rate

	campaign_name	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	Catalog sales	2137.22	328	1438	0.228094576	6.515915	1.48624478
2:	shopping cart	326.96	110	621	0.177133655	2.972364	0.52650564
3:	\$5 OFF code purchases - homepage	54.97	10	60	0.166666667	5.497000	0.91616667
4:	\$1 landing page - conversions	46926.63	12195	97485	0.125096169	3.848022	0.48137283
5:	january purchase campaign	5877.01	1389	12153	0.114292767	4.231109	0.48358512
6:	full face challenge - content read	315.09	34	495	0.068686869	9.267353	0.63654545
7:	IG sponge remarketing - conversion	84034.25	13304	224453	0.059272988	6.316465	0.37439575
8:	Mirror video _ sales	200.00	12	249	0.048192771	16.666667	0.80321285
9:	velvet clicks october	102.21	26	685	0.037956204	3.931154	0.14921168
10:	iphone giveaway	1059.39	41	1202	0.034109817	25.838780	0.88135607

Web Analytics III - Least Successful Campaigns

Top 10 States with the HIGHEST Ad Cost Per Purchase

> campaignmetrics[order(-costperpurchase)]

	campaign_name	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	nikkie velvet_links	282.38	0	73	0.000000000	Inf	3.86821918
2:	nikkie velvet_reach	279.67	0	26	0.000000000	Inf	10.75653846
3:	November views	89.69	0	435	0.000000000	Inf	0.20618391
4:	FB video post engagement	10.60	0	68	0.000000000	Inf	0.15588235
5:	full face challenge - traffic	1198.75	26	2699	0.009633197	46.105769	0.44414598
6:	October Mirror Purchase	973.48	31	2500	0.012400000	31.402581	0.38939200
7:	iphone giveaway	1059.39	41	1202	0.034109817	25.838780	0.88135607
8:	Mirror video_sales	200.00	12	249	0.048192771	16.666667	0.80321285
9:	Dec video IG views	1990.70	124	9101	0.013624876	16.054032	0.21873421
10:	velvet video_VIEWS	15567.72	1155	150717	0.007663369	13.478545	0.10329107

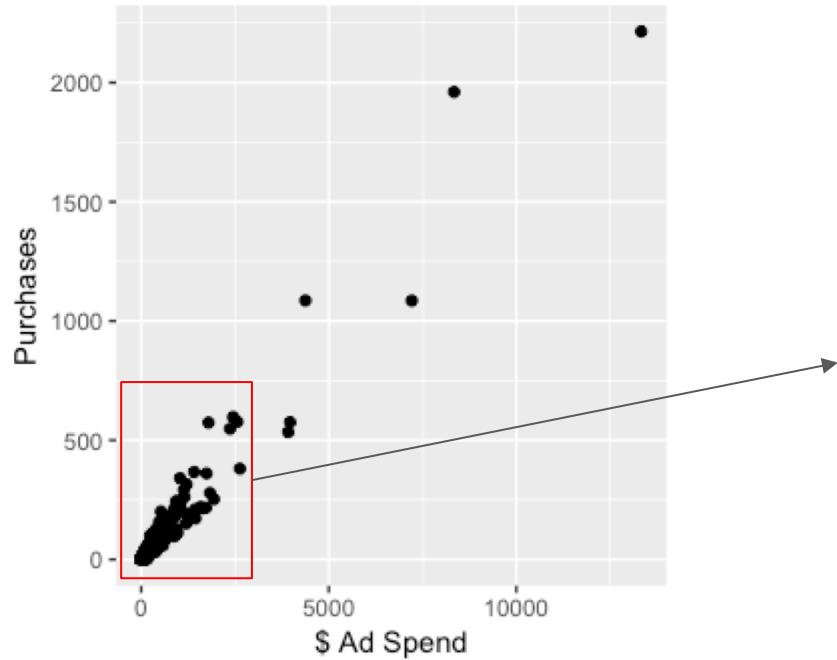
Top 10 Campaigns with the LOWEST Ad Conversion Rate

> campaignmetrics[order(conrate)]

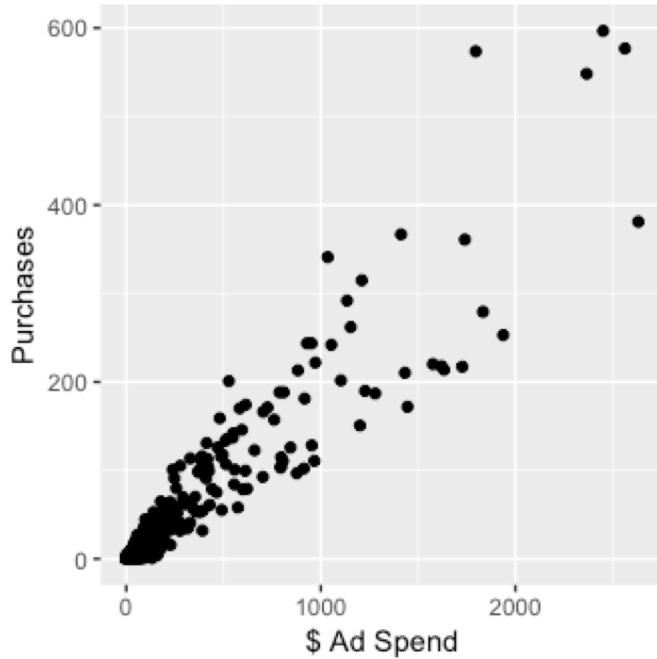
	campaign_name	totaladspend	totalpurchases	totalclicks	conrate	costperpurchase	costperclick
1:	nikkie velvet_links	282.38	0	73	0.000000000	Inf	3.86821918
2:	nikkie velvet_reach	279.67	0	26	0.000000000	Inf	10.75653846
3:	November views	89.69	0	435	0.000000000	Inf	0.20618391
4:	FB video post engagement	10.60	0	68	0.000000000	Inf	0.15588235
5:	velvet video_post engagement	185.62	16	2890	0.005536332	11.601250	0.06422837
6:	velvet video_VIEWS	15567.72	1155	150717	0.007663369	13.478545	0.10329107
7:	full face challenge - traffic	1198.75	26	2699	0.009633197	46.105769	0.44414598
8:	October Mirror Purchase	973.48	31	2500	0.012400000	31.402581	0.38939200
9:	Dec video IG views	1990.70	124	9101	0.013624876	16.054032	0.21873421
10:	Testing_May_clicks	3156.46	321	21685	0.014802859	9.833209	0.14555960

Web Analytics IV- Purchase vs Spend on Ad

Purchases vs Ad Spend



Purchases vs Ad Spend (Zoom In)

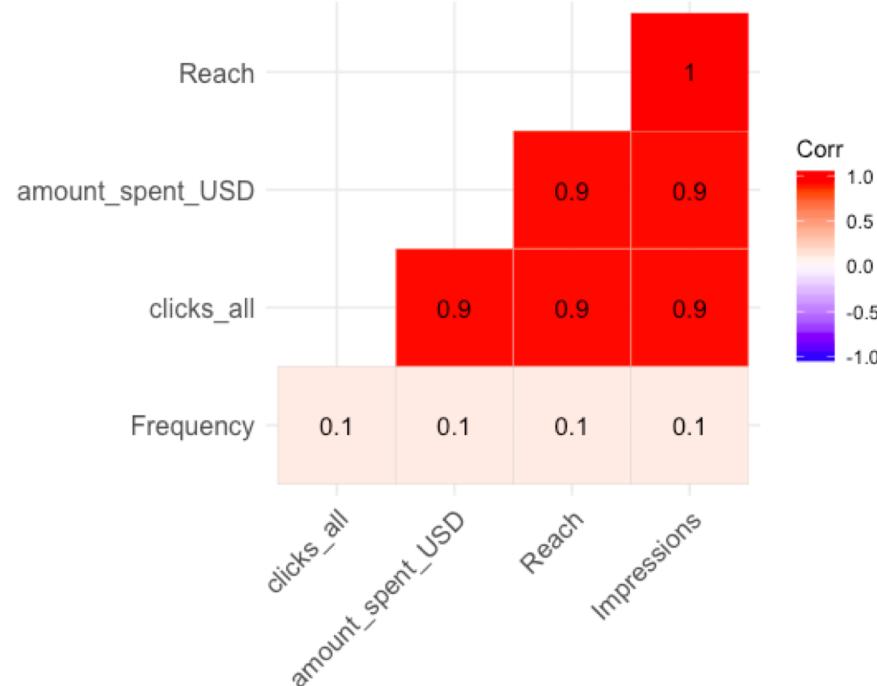


Regression - address Omitted Variables & Multicollinearity

Potential omitted variable bias:

1. Region difference
2. Seasonality difference
3. Campaign difference

Address the OV bias by running fixed effect on Region, Year-Month & Campaign



Regression Results

lm vs. felm

	Dependent variable: Purchases								
	OLS		felm	felm	felm	felm	felm	felm	
	lm1 (1)	lm2 (2)	(3)	clust (4)	region (4)	clust (5)	month (5)	campaign (6)	clust all (7)
amount_spent_USD	0.182*** (0.001)	0.182*** (0.014)	0.182*** (0.004)	0.182*** (0.024)	0.182*** (0.023)	0.182*** (0.023)	0.182*** (0.023)	0.182*** (0.020)	
CTR_link		-2.204 (1.954)		5.594*** (2.050)	5.594*** (2.007)	5.594 (4.459)	5.594 (4.459)	5.594* (3.331)	
Frequency			0.833 (1.166)	1.758 (1.420)	1.758 (1.699)	1.758* (1.038)	1.758* (1.038)	1.758 (1.541)	
Constant	0.658 (0.908)	1.814							
Observations	1,024	1,020	1,020	1,020	1,020	1,020	1,020	1,020	
R2	0.945	0.945	0.963	0.963	0.963	0.963	0.963	0.963	
Adjusted R2	0.945	0.945	0.955	0.955	0.955	0.955	0.955	0.955	
Residual Std. Error	28.215 (df = 1022)	28.220 (df = 1016)	25.580 (df = 846)						
F Statistic	17,547.570*** (df = 1; 1022)	5,847.541*** (df = 3; 1016)							

Note:

*p<0.1; **p<0.05; ***p<0.01

Limitations

1. Since the company is relatively young (with data only available from July, 2018 - February, 2019), we don't see trend for the whole year
2. If we have information on user demographic and interests (individual level data), we can do machine learning algorithms and make predictions
3. Since the company has a limited market budget, we do not see diminishing returns on ad / saturation
4. In the early months of the company, the focus could have been 'Reach' more customers instead of increasing 'Purchases'; then the key metric for our analysis could be different

Recommendations & Next Steps

Recommendations to the Company:

1. Focus on regions with highest conversion rates and lowest cost-per-purchase
2. Learn from campaigns with highest conversion rates and lowest cost-per-purchase
3. From regression analysis, we estimate that the company on average to spend 5.5\$ on ads for every unit increase in purchase. Comparing this to profit-per-order, the company can determine if it's profitable to do FB ads
4. Segment the users by age groups and evaluate

Next Steps in our Analysis:

1. Run experiments in different regions to verify regression results
2. Try quadratic term in Regression Analysis



Thank you!

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